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THE NATIONAL GEOGRAPHIC MAGAZINE

My Life in the Valley of the Moon

By General of the Army H. H. Arnold (Retired)

Formerly Commanding General of the U. S. Army Air Forces

With Illustrations by National Geographic Photographer Willard R. Culver

WORLD WAR II had ended. I was tired—quite ready to turn over the reins of air power to others—for I'd spent most of my adult life in airplanes.

So when reporters at a National Press Club luncheon asked me, "What are you going to do when you leave Washington?" I was ready to answer.

"I'm going out to my ranch, in California's Valley of the Moon," I said, "and sit under an oak tree. From there I'll look across the valley at the white-faced cattle. And if one of them even moves too fast, I'll look the other way."

"You mean you're through with airplanes?"

"*Yes!* If one dares fly low over my ranch house, I'll grab a rifle and try to shoot it down."

By chance, many news dispatches carried that wisecrack, which later was to bounce back on me!

Till we got settled on our ranch, we hadn't realized how calm and restful life could be, far from the din, bustle, and bustle of cities, far from all the talk I'd heard for years about flight training, airplane production, international conferences, armies, navies, and war.

We became just one more family of many families who live in this serene, picturesque Valley of the Moon, made famous by Jack London's writings (map, page 692). Our ranch is not large; but it's big enough to hold a fine house on a hillside (Plates II and III). Its patio furniture I made in my own workshop. The place is big enough for two dogs, a couple of horses, several hundred chickens, some dairy cattle, and a few Polled Herefords.

It wasn't our aim to go into the ranch business on a big scale. But we could, we found, make some money with milk cows, chickens and eggs, melons, vegetables—and hay.

"Chain Reaction" of Hay and Cattle

But we soon learned what every rancher knows about that endless chain—hay and cattle. It's like the hungry small boy—his jam and bread never come out even! Neither would our hay and cattle. More cattle, more hay; more hay, more cattle!

But that's no way to retire and rest, I figured. So, after an overnight decision, I took the bull by the horns, so to speak, and sold off all the dairy cattle.

I kept the Herefords—and the riddle, albeit a simpler one, of making hay and animals come out even.

Spaniards and Mexicans loved this valley and grazed their flocks and herds here generations ago. Their happy-go-lucky spirit of *mañana*, or never doing today what you can put off till tomorrow, still lingers.

We soon found it easy to slip into this serene way of delightful idleness. Everybody here likes to play, and the pioneer Spanish-Mexican fondness for fiestas still survives. How readily we took to it!

Particularly pleasant it is for my wife and me to sit in our redwood chairs, drink in the quiet beauty of our valley, and watch the half-tame quail feed about our garden.

How far away, on such calm, sunny afternoons, seem all the roar of four-motor bombers, the fiery flash of aerial battle, or even the wrangles of diplomacy.

This Adobe Wall Was Standing when California Was Mexican

Around 1836 Gen. Mariano G. Vallejo, Mexican military commander in northern California, built the house near Petaluma for watching the aggressive Russians (page 696). From their stout stockade at Fort Ross, the Muscovites sent trappers to hunt sea otters and agents to stir up the Indians. Other foreign powers made bids for California, but Vallejo coped with all save the Americans.

But suddenly, one startling day, this idyllic picture changed!

An Airplane "Possessed of the Devil"

With all of California—in fact, with the whole Pacific Ocean available to them—two pilots in separate planes had to pick the air just over our valley for their dogfight practice!

Worse yet, they picked the air right over our ranch! . . . Get out the machine gun, Garand rifle, carbine—anything that will shoot!

Round and round those two Air Force planes cavorted, perhaps to show a friend in the vicinity how good they were, perhaps to impress their former chief. Who knows?

The climax came more swiftly than anyone anticipated. The pilots were not so good as they thought they were; their flying precision did not equal their good ideas and intentions. As suddenly and as unexpectedly as those things happen, one plane flew too close to the other and cut its tail off!

How disconcerting to the most unabashed airman, to find himself in the air over the home of the erstwhile Commanding General of the Army Air Forces with no tail on his plane!

The plane that had done the damage, suffering itself from a damaged prop and landing gear, limped back to Hamilton Field, some 20 miles distant, and landed on its belly. The pilot was uninjured; there was no passenger.

The second pilot, the one of the tailless plane, bailed out, and floated with the wind to a golf course two miles away, where he landed unharmed.

But his plane! It acted like a thing possessed of the devil. It did none of those things a normal plane should have done. Any aeronautical engineer or designer will tell you it is impossible for a plane to fly without a tail. But that one did! It maneuvered in circles of ever-decreasing size, always coming down closer and closer to our house.

Down, down, but always flying just as if it were spiraling normally. It came so close we knew it must hit the house, cover it with gasoline, and start the inevitable disastrous fire. But it missed the roof by inches!

Over the rose garden it went and out into the south pasture, where it crashed and exploded in a hole it had made in the ground some 30 feet across. Almost instantly it was

consumed in fire of great intensity. Nothing left but a mass of wreckage!

My conscience was clear. I had *not* shot it down! But would any of my Eastern friends believe me? Far too many letters were received shortly thereafter. "Well, I see you did it! What kind of gun did you use?"

Since then, no more airplanes!

The serenity of the Valley of the Moon is wonderful; so much so that this morning one of the men working on the place went up to the spring, saw what he thought was a jack rabbit's hind end, tried to grab its legs, and found it was a fawn! He saw the doe and another fawn, and then, almost too late, the buck, charging out of the bushes right at him.

He ducked behind a rock for safety, just in the nick of time. The buck shoved the two fawns into the brush with his horns, and the family disappeared.

The Author Plants a Baby Giant

"For about 40 years," writes General Arnold, "I have traveled to all kinds of places in many corners of the world. . . . When we came to selecting a place to settle, we chose the Valley of the Many Moons." This seedling came from the Spreckels estate a few miles from the Arnold ranch. "Come back in 2,000 years and I'll show you a giant redwood," says the retired air general.

Wildlife Neighbors and Bird Visitors

Why did we come to El Rancho Feliz?

I suppose, from a practical standpoint, chiefly because Sonoma is one of about three spots in the United States where my wife does not suffer acutely from hay fever.

But, apart from that, we would have come, anyway. Does one need further reason than a family of unafraid deer not more than a few hundred feet away from his back door; or three coveys of quail that come to the house to get feed and water, morning and night; or the dozens of hummingbirds, and many other species of birds, that come daily to the bird baths and to the dishes of tidbits that are always ready for them?*

Could one ask more than expansive horizons of softly rolling wooded hills stretching away to blue-misted mountains (page 694); or the fascination of the valley itself—the colorful woof and warp of its history, its serene indifference to the driving, restless tempo of today, its charming devotion to the gracious living, the leisureliness, the romance of a yesteryear?

Sonoma is an Indian name. Some say it means "Valley of the Moon;" others insist it means "Valley of Many Moons." Still others

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Holidays with Humming Birds," by Margaret L. Bodine, June, 1918; "Hummingbirds in Action," by Harold E. Edgerton, August, 1947; "Befriending Nature's Children (California wildlife)," by Agnes Akin Atkinson, February, 1932.

Drawn by Harry G. Oliver and Irvin G. Atkinson

California's Romantic Valley of the Moon Lies Within Easy Distance of San Francisco

Sonoma, where General Arnold retired to a ranch home, was Mexico's northern California headquarters. Fort Ross was the Russians' coastal citadel. Drakes Bay is named for Sir Francis Drake, who landed from the *Golden Hind* in 1579, set up a cross, and claimed the country for the British. Jack London had his ranch home near Glen Ellen. Napa is famous for its wineries.

say it was formerly the name of an Indian chief and has a different meaning.

When we who live here see the moon rising over the Mayacmas Mountains, we understand why Indians thought there were many moons.

A Valley of Rich Variety

Standing out with surprising bigness, apparently never twice in the same place, the moon appears and disappears behind the different peaks. It may suddenly make a startling appearance above a low point on the mountain ridge; again, it may come from behind a clump of trees or over a large live oak, but, seemingly, always from a different direction.

As valleys go, the Valley of the Moon is not large. It probably measures about 10 miles across its base at the south, where it opens out into the level, low-lying plains and swamps that border San Pablo Bay. Triangular in shape, the distance to the apex at the north is about 15 miles.

Small as it is, in pre-white man days the valley provided food and clothing for several thousand Indians. Deer and bear roamed the wood-covered hills and mountain sides, even after the white man came.

Down in the valley proper, lush grass and native clover covered the fertile land, which, with its rich vegetation and many clear streams, provided food and shelter for numberless flocks of ducks and geese and for the beautiful California quail. Then, too, the streams were filled with fish.

Food was never a question for early inhabitants. Neither was there any need for a Fish and Game Commission to create and enforce conservation measures prior to the coming of the white man.

The Grapes of Three Valleys

Adjacent to the Valley of the Moon, beyond the range to the east, lies the Napa Valley. This entire area—the Sonoma, Napa, and Petaluma Valleys—provides our country with some of its very best grapes and its extra-fine wines. To this section came the Italian, Swiss, and French vinegrowers and winery experts, bringing with them the European technique of growing grapes and making wines. Today wineries are spotted throughout the area (Plates V, XI, XIII, and page 713).

At the head of Napa Valley lies Calistoga, a small town marking the site of an old Indian village located near active hot springs and geysers (Plate VII). The Indians seem to have recognized the health-giving properties of the hot sulphur-bearing water and built shelters for those who came for treatment.

Many years later the white man came. He not only realized the benefits of the hot sulphur water but also sensed the scenic value of the geysers, from an economic point of view, and, in his efforts to capitalize on both, established the town of Calistoga.

What effect, if any, all this heat and constant turmoil beneath the earth's surface had upon forests of hundreds of centuries ago is not clear; but not many miles from the Calistoga geysers lie gigantic petrified redwoods.

These enormous trees maintain their grandeur even in a petrified state, regardless of whether they are entirely uncovered or whether they lie with but a portion of their trunks exposed, the balance of the trees still remaining hidden in the hillside. Trunks of these petrified trees look similar to those of their descendants, which today grow to great size and height in this area (Plate XII).*

Near the head of the Valley of the Moon is the city of Santa Rosa, seat of Sonoma County. County government was moved to Santa Rosa from Sonoma one evening, when the good citizens of Sonoma were having a town meeting to determine just how to prevent the Santa Rosans from getting it!

Santa Rosa is an extremely modern, fast-growing young city. Luther Burbank settled there in 1875. He obtained a small plot of ground, and then, with his uncanny knowledge of plant life, gave to mankind vegetables and fruits larger in size and more improved in flavor than any that had yet been produced, even in California! Burbank's home and gardens are still a mecca for thousands of tourists (Plate VI).

Egg Basket of a Nation

To the west of Sonoma Valley, across a small range, lies the Petaluma Valley. It has been known for many years now as "the egg basket of the United States." Chicken ranches are as thick there as orange groves in southern California. Every family, regardless of the size of its property, seems to raise chickens and sell eggs. Chickens, mostly white Leghorns, are seen in all directions, by thousands and hundreds of thousands.†

This entire area, from the Pacific shores eastward to the great Sacramento Valley, also provides pasture for hundreds of dairy farms and ranches, with their Jerseys, Guernseys, and Holsteins.

Sonoma Valley has abundant natural and farm resources. Why Spaniards were so slow to realize its value is not clear. After establishing the Mission Dolores in San Francisco in 1776, they slowed up in their explorations and settlements. It seemed they needed a new impetus, an extra push, to carry them into this then unknown territory to the north of San Francisco Bay.

The region was not entirely unknown to white men, however, for in 1579 Sir Francis Drake, if we may accept some historians, led a small detachment across the mountain ranges from the Pacific and may have traveled as far east as the Valley of the Moon. The trip was made while sailors careened his ship for recalking and cleanup on the shores of what is now Drakes Bay.

The Spaniards themselves should have known something of the fertility of the area, after Captain Quiros, having left the San Francisco water front in a barge, poled, sailed, and rowed up the Petaluma Creek in 1776.

In much the same way as they proceed today, without so much as a "by-your-leave" or "may-we," in 1812 the Russians landed at Bodega Bay, west of the Valley of the Moon. Before the slow-moving Spaniards

* See "California's Coastal Redwood Realm," by J. R. Hildebrand, National Geographic Magazine, February, 1939.

† See "Northern California at Work," by Frederick Simpich, National Geographic Magazine, March, 1938.

Luther Burbank's "Chosen Spot of All Earth" Delights Travelers, Who View the Valley from Its Eastern Approach

Indians named the Valley of the Moon, and Jack London, who owned a ranch here, spread its fame. Prosperous little communities, pleasure resorts, vineyards, poultry farms, and cow pastures dot the valley. The mountains "are lovely," Burbank wrote; "the valley is covered with majestic oaks. I cannot describe it."

realized what had happened, they had established permanent settlements, with fortifications, not only on Bodega Bay but also at Fort Ross, some miles north.

From that time on, Russian hunters and trappers roamed the entire coastal and valley areas at will, going as far south as San Francisco Bay.

By 1816 the Russians had 28 of their own countrymen and 80 Aleut Indians at Fort Ross. That same year they called on the Spanish governor at Monterey, asking for a treaty to cover their settlements and their fur hunting. That seemed the "push" the Spaniards needed!

Up to that time they had been using velvet glove tactics; but now they politely but firmly asked the Russians to go home. The Russians, using their own brusque methods, declined as firmly to go, in the meantime continuing their trapping, hunting, and foraging over the entire Sonoma region. This matter was not settled until the Russians' voluntary withdrawal in 1841.

The Russians Left Their Mark

The Russians did not withdraw from this section of our country without leaving their mark. We still have "Russian River" and "Fort Ross," and small near-by towns, each an outgrowth of an early Russian settlement.

A far more serious and important Russian imprint, however, is the effect of their indiscriminate campaign against fur-bearing animals.

The sea otter is a typical example. In the early 1800's these animals were found along the California coasts and in the bays in countless numbers. Killing them for their fur was comparatively easy.

While the Russians were in northern California, slaughter of these sea otters was terrific, comparable to our slaughter of the bison on the Great Plains. Although the Russians were not solely responsible for the almost complete extermination of the sea otter, they probably killed more than any other one group of people.

In the years following the Russian departure, practically no sea otters were to be found. Today, after years of conservation measures, they are staging a comeback, so that one may now occasionally see several hundred of them at a time.

To return to the northward march of the Spaniards:

In 1817 they established a mission at what is now San Rafael. Later they sent another expedition to Sonoma Valley to explore and see what the Russians were doing. Gabriel Moraga, leading the party, reached Sonoma Valley but returned after a tough fight with the Indians, having accomplished little.

Four years later, in July, 1823, a Sonoma settlement was started in earnest.

In that year Ensign José Sánchez, Don Francisco Castro, and Padre José Altimira paddled up Petaluma Creek and crossed the mountains into Sonoma Valley. They found the hills covered with large oaks of many kinds, red madroña, manzanita, and bay trees; in mountain valleys they found the giant redwoods.

They crossed more streams and located more springs, both hot and cold, in the valley than they had ever seen before in California. Wild game seemed to be everywhere. Indians told them they were in "Sonoma Valley."

They selected a site near the clear, cool springs and planted a cross, the location of the new mission. Padre Altimira wished to locate a site for a mission which would replace the Mission Dolores in San Francisco. They had found in this valley everything that was lacking on the sand dunes surrounding the San Francisco Mission.

Here was the place to establish the last of the missions. The white man had arrived, had come to stay, in the "Valley of Many Moons."

Spaniards called the place "New San Francisco." Padre Altimira wrote in his journal: "Everyone is greatly pleased with the location, particularly with the native stone to be found for building and with the many springs of clear water." Later he wrote to the governor: "All agree that it offers more advantages than any place between here and San Diego."

Founding of Sonoma Mission

The mission was completed and called "San Francisco Solano." Missionary work was started. Papooses were baptized; Indians were clothed and fed, taught religion, sewing, and various arts and trades. Male and female Indians were housed in separate buildings. Everything seemed to be progressing most satisfactorily when in 1826 the mission burned to the ground. History places blame for the fire on the Indians.

The mission was destined for much misfortune. It later burned a second time, but by 1829 a new mission, an adobe building with tile roof, was completed. This time the mission was there to stay.

During this later period, a new figure, Mariano Guadalupe Vallejo, rose in the Spanish government. Vallejo was a very young man in 1829 when he took over as commandante of the Presidio of San Francisco.

Prior to that he had shown remarkable skill, not only in fighting and defeating the Indians but also in getting along with them as neighbors without fighting. He had also gained the reputation of being a military leader, an excellent disciplinarian and drill-master.

Realizing the capabilities of Vallejo, Governor José Figueroa sent him to colonize the northern frontier and later to secularize the missions. Vallejo started at once making trips throughout the territory under his jurisdiction. On his first trip to Sonoma he lost a saddle horse on an island in San Pablo Bay. The mare was finally found, and a new name came to California (attention Navy), the Spaniards calling the island "Mare Island."

In the meantime, the Sonoma Mission had grown and prospered. Its grainfields yielded 2,000 or more bushels a year; its holdings comprised over 2,000 head of cattle, 700 horses, 4,000 sheep, and a vineyard with more than 3,000 grape-bearing vines.

Figueroa continued to be much disturbed by the aggressive actions of the Russians. In 1833 he sent Vallejo to Fort Ross to learn just what the Russians had in mind with regard to their future settlements, what kind of alliances they were making with the Indians, and what their intentions were.

Russians "Viewed with Alarm" in 1830's

Vallejo was convinced that additional settlements must be started nearer to the Russians, to stop their advance. In October of 1833, Spaniards began to arrive at Petaluma; another colony was started at Santa Rosa. Neither colony lasted long, but there stands today the old adobe ranch house built in 1836 by Vallejo near Petaluma on the ranch he had selected for his own operations (page 690).

Figueroa still "viewed with alarm" the Russian situation and designated Vallejo as "Military Commander and Director of Colonization of the Northern Frontier," with instructions "to establish a colony at Sonoma and arrest the progress of the Russians."

With Indian and other aid Vallejo moved his headquarters to the site of Sonoma and laid out plans for a pueblo. He first outlined a central plaza of about eight acres and built the pueblo around it.

A road 110 feet wide, sufficient width for six pieces of artillery to gallop abreast, was staked out, leading south from the plaza to the point of debarkation on Sonoma Creek. Town lots and large acreages were granted to Vallejo's friends and relatives. Barracks for his soldiers and Vallejo's quarters were placed adjacent to the mission.

Fortifications were built in the near-by hills, and a wall with embrasures was erected around the barracks. In determining the metes and bounds of the pueblo, Vallejo used a hand compass and a leather lariat. The hand compass was not too accurate, and the lariat stretched, or became taut, depending upon whether the air was damp or dry, and whether the survey was made in the early mornings or during the dry middays.

These irregularities in directions and distances caused the American civil courts much trouble years later when it became necessary to record the deeds.

Two taverns were built in the pueblo, the Blue Wing Inn and Hotel El Dorado. Both housed many famous men during the next few years. In its early history the Blue Wing provided quarters and gambling accommodations for Joaquin Murieta, the outlaw, and for "Three-fingered Jack" Garcia. Their gangs, dispersing after robberies and raids in far-distant parts of California, retreated to this famous old inn.

Fugitives from justice seemed to gravitate toward Sonoma. A "Colonel Rogers" (an assumed name), wanted for crimes in the East, lived in the General Persifor F. Smith home for about 30 years. He probably could have spent the rest of his days there in peace, had it not been for his inherent fear of Federal officials.

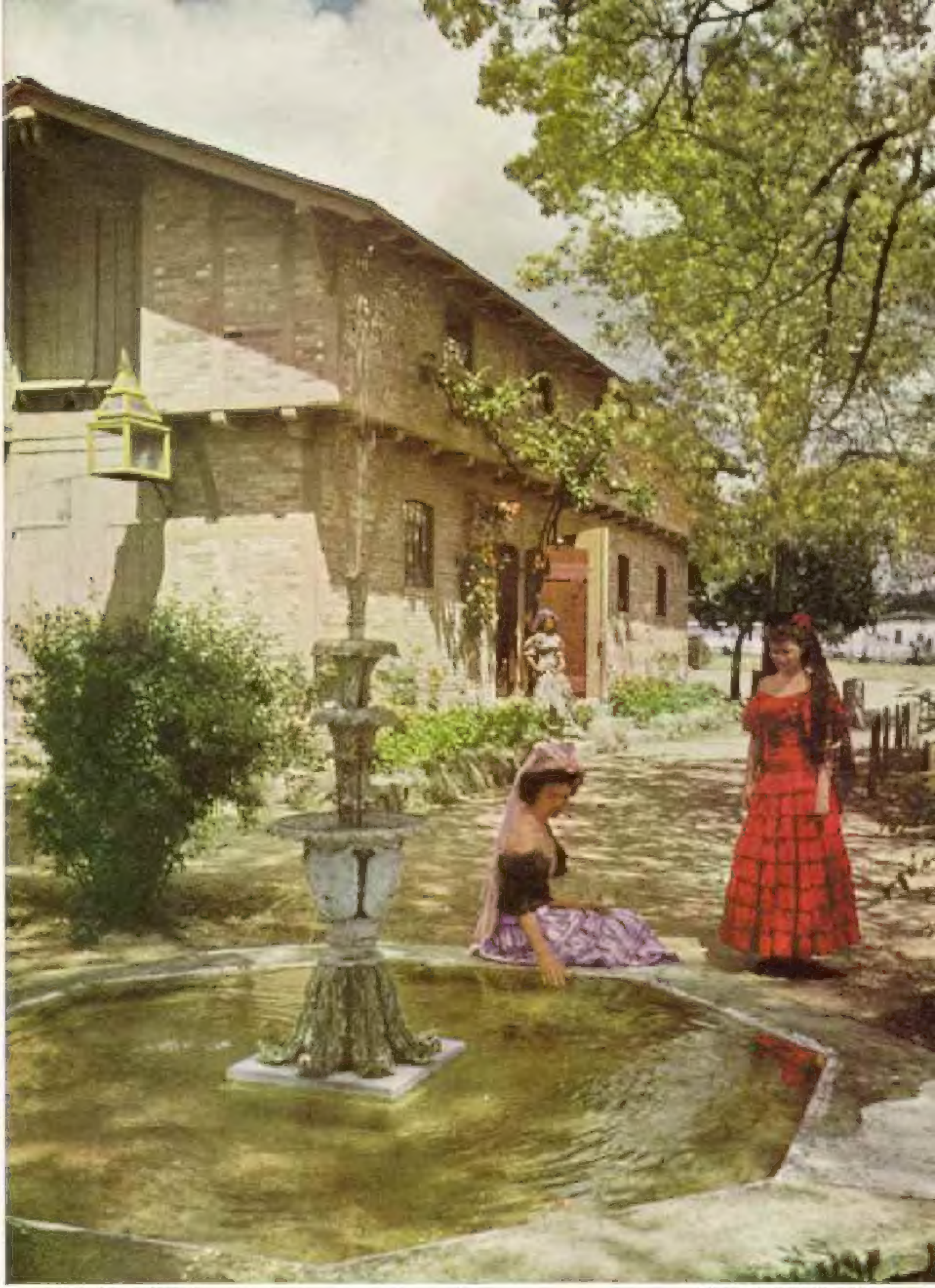
When President Grant landed in San Francisco on his return from a tour of the world, he made a trip to Sacramento. When he expressed a desire to return to San Francisco by coach, a search was made for a suitable stopping place at which to spend the night. Somebody suggested General Smith's home at Sonoma.

To this Colonel Rogers objected. The Secret Service became suspicious. An investigation was made, and Colonel Rogers was returned to the east coast for trial. His case was dismissed, but the "Colonel" did not return to Sonoma.

"Tears of the Mountain"

Vallejo used the springs to the north of the city as a water supply for his troops. He called the springs Lachryma Montis, "Tears of the Mountain." Those springs give forth abundant pure, fresh water and have been used by the city of Sonoma as a water supply ever since Vallejo burned the three-inch holes through redwood logs for water pipes. Thus was created the city's first water supply (Plate V).

The Spanish settlement at Sonoma prospered from the first. The soil was extraordinarily fertile, water was plentiful, and hot



Kodachrome by Willard R. Culver

A Swiss Chalet in the Valley of the Moon Recalls California's Gold-rush Days

Its timbers, ready-cut and numbered, served as ballast on a ship carrying forty-niners around the Horn. The chalet stands in Sonoma on an estate of Gen. Mariano Guadalupe Vallejo, the valley's pre-American overlord.

Home from the Wars, General of the Army H. H. Arnold Strolls the Color-splashed Flower Gardens of His Valley Ranch

On a Sierra Terrace Overlooking the Valley's Eastern Rim, General and Mrs. Arnold Enjoy the Handsome Resorts of Peace

This Valley Ranch's Off Swimming Hole Is a Miracle Pool on a Sunsdrenched Terrace

[illegible]

< Mirvache Breaking He Primes and Uses a Native-ward Mountain's Horses

[illegible]

Redwood Water Pipes > Brought the "Tears of the Mountains" to Sicamia

[illegible]

Luther Burbank's Velvet-skinned Cactus Holds No Terrors for Bare Arms and Legs

In Santa Rosa the great [illegible] produced [illegible]

Tour Sue Hayes' Vacationists Drive to California in Old Cadillac Shows Steward

Flags from California's Past and Present Attest the Hair-trigger Balance in Which the State's Future Lies. Page 2

Bird in Bear, Mexico [illegible] In [illegible] the Lone Star [illegible] The [illegible] Mexican Colonial Banner of Old Glory

Sidewalk Plantings Brighten Neighborhood Lawns — "Curb Service" Provides a Young Cyclist with a Nosegay of Showy Fig-Marigolds

Under a Hot Sun Pickers Toil and Train the Growing Hop Vines in a Vast Spider's Web of Trellis Strings

A Farmer Cultivates Grapevines and Vintners in the Valley of the Moon Surrounded by California's Vast Wine Industry

Restored Monarch in the Petrified Forest Rises Protective Arms Six Million Years Old

From an 1890-vintage Cask, a "Wine Thief" Steals a Sample of Its Aging Burgundy

[illegible]

Sentinelike Eucalyptus Trees, Warped as a Few Rods Racing Inland from the Pacific Stand Guard Across Decorative Weeds

On the Jack London Estate Now a Dude Ranch Saddle Horses Graze on a Sunny Hillside Pasture

After Years of Wandering, Jack London Settled Down on the Valley of the Moon

[illegible]

springs provided health centers. Abundant stone and the woods covering the hills provided plenty of building materials.

In 1845 the Comandante's brother, Salvador Vallejo, planted an enormous vineyard, long known as "Buena Vista." That vineyard was to make history for the wine-making industry. It continued as just another large vineyard until 1856, when Col. Agoston Haraszthy, a Hungarian nobleman who knew vines and wines from long years of experience in Europe, bought the property.

Haraszthy went back to Europe shortly after. When he returned to Sonoma, he brought back large quantities of cuttings from the best vines abroad. Within a short time he had 6,000 acres of vines growing, vines of the best types, but, what was far more important, he was growing the vines without irrigation!

He thus introduced into California a new technique in the raising of grapes. It was not long before most of the vineyardists in California stopped irrigation of their vines. The Buena Vista Company built long underground caves in the limestone hills, similar to the best European wine caves, or cellars, and these Buena Vista cellars still exist.

While the pueblo was growing and prospering, it seemed that Vallejo himself was to have one great problem after another in his administration of the northern frontier. Other nations besides the Russians were interested in this fertile area.

In 1841 John McLoughlin, the Hudson's Bay Company factor at Fort Vancouver, and Sir George Simpson, governor-in-chief of the Company's activities in the Americas, paid a visit to California. In January of 1842 they worked their way up Sonoma Creek.

Reaching the dock after dark, they spent the night there quite uncomfortably, but next morning everything was changed. Vallejo gave them a true California welcome, with troops, Indians, salutes, coaches, and flowers galore! With his customary hospitality Val[illegible] They saw the entire Valley of the Moon and surrounding countryside at its best, with local guides to show them points of interest.

When the sight-seeing was over, Sir George Simpson talked with Vallejo about California's past, present, and future. Very quietly, and with true British tact, he led up to suggesting the advantages of tying up with the English. Looking back on that conference, it would [illegible] United States are fortu[illegible] Vallejo [illegible] the [illegible] the [illegible] the [illegible] the [illegible] the next morning, the purpose of their visit unfulfilled.

Not many months before, Vallejo had had a visit from a French representative, M. Eugène Duflot de Mofras, from the French Legation in Mexico City. After De Mofras had taken the customary trips around the valley and had been extended the usual hospitality, and departed, Vallejo wrote to his governor: "There is no doubt but that France is intriguing to become mistress of California."

Though Vallejo balked the diplomatic approaches of the British and the French, the envoys, advance agents, and pioneers of another great country were in the offing. By them he was to become "baffled" and completely baffled.

Then Came the Americans!

The American settlers started coming like a gentle breeze and ended like a hurricane! Nothing that Vallejo did, no action that he took, seemed to retard their arrival or postpone the inevitable.

The first of the Americans came out to settle in the valley in the 1830's. For a while their numbers were small and presented no great problem for Vallejo. He was a very generous man and even gave land grants to those he thought worth while. However, when the 1840's came around, the American settlers, hunters, and trappers had begun to reach the Valley of the Moon and its surrounding area in large numbers.

In the meantime, the governor had directed Vallejo "to drive the immigrants back across the mountains." Vallejo could not see his way clear to do this. Having to pay his own army personally, and all danger from the Indians and from the Russians now being gone, Vallejo dismantled his troops.

Besides Vallejo, there was another man in California at that time who understood the Mexicans, and understood them well. That man was Capt. John C. Frémont. Frémont also recognized the strength and capabilities of Vallejo. At the same time, he realized that drastic action of some kind must be taken to establish American control of California.

On June 14, 1846, either with or without Frémont's backing, a group of 33 well-armed men, under the leadership of Ezekiel Merritt, rode from the vicinity of Frémont's camp, near Sacramento, to Napa. There they stayed for two days. Then, with a very early morning start, they rode to Sonoma, arriving about daybreak on June 14th. There was little Vallejo could do about it, for his small detachment of soldiers was no match for the American riders.

A Man-tailored Bird Is Measured for White Meat

[illegible] Valley of the Moon and the cockerel [illegible] Petaluma, are [illegible] cockerel and pullet [illegible] meat [illegible] apparent fear of the camera.

[illegible] Capt. John B. Frisbie, [illegible]

Days of the Gold Rush

[illegible]

they came from curiosity, or they came just as travelers. The register of the Blue Wing must have been a "Who's Who" of California.

Frémont arrived almost before the Bear Flag was hauled down. Gen. Persifor F. Smith, American military governor, established his headquarters here in 1849. Kit Carson was present at the time of the Bear Flag revolt. Governor Lilburn W. Boggs served there as first American civil governor of northern California.

Three lieutenants of the U. S. Army, U. S. Grant, W. T. Sherman, and Philip Sheridan, each destined to become a great war leader for the Union cause, lived in the small town for a while.

Jack London Added to Valley's Fame

Once, when the town mayor "got off the beam" in his work, Sherman was sent to Sonoma to bring him to Monterey for disciplinary action. This he did with customary Sherman efficiency. H. W. Halleck and Joe Hooker, two Civil War generals of note, were stationed at the Sonoma barracks for a time. Hooker remained in the valley longer than most of the others. He acquired a large acreage to the north of the town and lived there until the Civil War called him away.

Our list of relatively contemporary celebrities who came to the valley can terminate with Jack London, who arrived in 1904 and later bought a ranch of some 1,400 acres high up on the mountainside. It was there he built his home, "Wolf House," an impressive dwelling wonderfully located. However, it burned before he ever lived in it. Jack London wrote many of his novels in the valley; one, *The Valley of the Moon*, probably was the first advertisement for the valley (Plates XV and XVI).

Sonoma did not grow fast. A railroad was built to the valley; the civil governor and his staff departed to establish their capital elsewhere; the military headquarters left for other parts. Sonoma even lost to more ambitious and energetic Santa Rosa the distinction of being the seat of county government.

Vineyards and wineries increased. Small resort towns grew up around the hot springs. Orchards were planted, which produced prunes and pears with the same profusion as that with which the vines grew grapes.

In the 1890's it was apparent that Sonoma, the Valley of the Moon, was just about the right distance from San Francisco for weekend residences. Thus came into existence Sobre Vista, the Spreckels estate. Here Rudolph Spreckels raised and raced horses, had fine cattle and vineyards, and the Valley of the Moon again became well known throughout the State and the country. Mrs. Adolph Spreckels lived there for years. During World War II she generously turned her estate over to our Army Air Forces for use as a rest and recreation center.

Today Sonoma is still a small town of about 1,500 people. Its characteristics have not changed very much since the days of Vallejo. The vineyards are still flourishing, the wineries are operating, Buena Vista is being rejuvenated, and its vineyards and winery are producing lavishly.

A new industry has made its appearance, the raising of turkeys. In the Valley of the Moon the broad-breasted ("Mae West") turkey is raised in large numbers. Turkey ranches are small, medium, or large. With 4,000 turkeys you have a small ranch; with 7,000, about medium. Then there is the Weldender Ranch where some 60,000 turkeys a year are raised. That is a big one!

Turkey raising is a very exacting business, because the birds can be inexplicably dumb! For example, if one frightened bird climbs into a barrel, all the others try to follow, and soon a couple of dozen have smothered to death!

Horse racing and training in the valley have changed. Instead of racing thoroughbreds, attention now centers on raising and training three- and five-gaited horses. The Wagon Wheel Ranch not only sends turkey eggs and turkey breeding stock all over the world; it also raises outstanding five-gaited horses.

Old Landmarks of the Plaza

The Sonoma plaza today retains many of the old landmarks. The mission, rebuilt around the original adobe walls, is now a museum. The barracks, built to shelter the company of Spanish soldiers mobilized by Vallejo to keep the Indians under control and to prevent further advance by the Russians, is still here. The Blue Wing tavern still stands in its original form. The El Dorado is there, too, but it has had so much modern face lifting that it has lost its attractive Spanish character.

A corner of the plaza, where the original Vallejo flagpole stood and where the Bear Flag was raised, stand now a commemorative statue, a plaque, and a new flagpole. Pieces of the original flagpole are in the museum. The Vallejo ranch house has been taken over by the State and is unchanged in form or appearance.

Around the pueblo are many of the original adobe houses which still retain their unique appearance. From time to time, when excava-

Sonoma's Bear Flag Plaque Marks the Spot Where American Rule Began in California

[illegible]

[illegible] from the Chain of Mariano Vallejo. The climate, the trees, and the rolling hills are the same.

[illegible] Yours. I have attended with my family every kind of place in [illegible] world. We have [illegible] the forest Plaza along the Green Lake and in the mountains.

We have [illegible] the [illegible] and [illegible] from the heat, [illegible], and the [illegible]. We have [illegible] and comfort in the [illegible] of the Atlantic States.

However, when we come to [illegible] to secure a [illegible], we will [illegible] the Valley of the Moon Maps.

Valley's Charm Unchanged

[illegible] the [illegible] and the [illegible] are unchanged

Masterpieces on Tour

By Harry A. McBride

Administrator, National Gallery of Art

MIRACULOUSLY surviving the war, some of the greatest art masterpieces of Europe, many painted before Columbus crossed the Atlantic, are being seen and enjoyed by millions of Americans. Nearly a million people viewed them in Washington, D. C., alone.

As art lovers feast their eyes upon these priceless works of long-dead masters—or view the reproductions of selected paintings in these pages, they may well see in the background the aerial flash of bursting bombs, furtive flight from shattered Berlin, the gloom of a German salt mine. Probably no such collection of art in history has traveled so far and had so many narrow escapes.

Safeguarded as carefully as VIP's (Very Important Persons), 202 German-owned masterpieces were brought from Germany by the United States Army in December, 1945, for safekeeping and proper preservation at the National Gallery of Art, in Washington. They soon became known as "very important paintings."

In the collection were 15 works by Rembrandt, six by Rubens, five by Botticelli, two by Pieter Bruegel (Breughel) the Elder, two by Vermeer, three by Raphael, five by Titian, three by Watteau, and five by Jan van Eyck, as well as paintings by Fra Angelico, Giovanni Bellini, Lucas Cranach the Elder, Durer, Giorgione, Frans Hals, Hans Holbein the Younger, Fra Filippo Lippi, and others (Plates I to XXIV).

"Very Important Paintings" Cross Country

From Washington all but the most fragile have gone on a tour of 13 cities—New York, Philadelphia, Chicago, Boston, Detroit, Cleveland, Minneapolis, Portland (Oregon), San Francisco, Los Angeles, St. Louis, Pittsburgh, and Toledo—before being returned to Germany.*

What a story these paintings could tell! Like Europe's millions of displaced persons, they were shunted hither and yon by war.

All but two of the paintings in this famous collection came from the Kaiser Friedrich Museum, in Berlin. This impressive building of Italian Baroque style was completed by the German Government in 1903 at the junction of the Spree River and the waterway called the Kupfergraben in the heart of the city. At the start of World War II it housed one of the world's greatest art collections.

The real nucleus of the collection was the gift in 1821 of nearly 600 paintings, mainly of the Italian schools, by the British merchant, Edward Solly, then living in Berlin. In fact, the Solly mark appears on the backs of several of the masterpieces which traveled to America. Among these are the famous "Saint Sebastian" and the "Venus," by Botticelli; "Madonna and Child," by Raphael, and the famed Titian "self-portrait."

The museum building itself suffered severely from aerial bombardment. The massive dome was shattered, a large part of the roof demolished, the lower floor piled high with rubble, and the stone walls so cracked that the cellars were flooded with several feet of water. Its reconstruction will be a long and costly job.

In the first days of the war the Nazis expected heavy air raids over the German capital; in 1939 the curatorial staff of the Museum hurriedly removed the most precious works of art to its vaulted stone cellars.

Although early air raids did not materialize, the paintings were left in the cellars. Many were carefully crated, but not all, because even then wood was scarce, and specialists to do the packing were even scarcer. The uncrated paintings were merely stood against the cellar walls.

In 1943 air action over Berlin started in earnest. Close to two railroad stations, the Kaiser Friedrich Museum, with its glass skylights, no longer formed a safe repository for such treasures. The collection made its first move from home, to an air raid shelter on Flak Tower.

Soon this protection also became inadequate and a second move was made, this time to a flak tower, a huge concrete anti-aircraft station, near the Alexanderplatz.

The flak tower provided excellent protection. The paintings were placed on various floors. There were accommodations for a curator and restorer and, most important for preservation of the paintings, the structure was air conditioned.

Early in 1944 conditions in Berlin became more and more critical. As air raids increased in intensity, the art experts wanted the paint-

* The German-owned paintings [illegible] at Minneapolis, October 29–November [illegible] November 24–December [illegible] 28, Los Angeles, January [illegible] 29–February 11, Pittsburgh, February [illegible] 14, and Toledo, March [illegible]

A Record-shattering Throng of Art Lovers Surges at the National Gallery's Doors

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Ten-hour Trip to a Salt Mine

[illegible]

The Army Ran the Art Show; Snappy MP's Warned Any Poking Finger "Don't Touch!"

National Gallery [illegible]

museums and at other institutions throughout the country, [illegible] to see a p[illegible] because of [illegible]

Since the trucks could not travel by night [illegible] the journey required [illegible] a few miles outside [illegible] Neither [illegible] protection was provided for the precious cargo [illegible] during the evacuation, no bombers were encountered and no rain fell.

Only [illegible] trucks were available, and [illegible] each before further [illegible] became impossible. The 10-hour trips [illegible] taking place were all accomplished safely.

The destination was the Merkers salt mine, southwest of Erfurt. Here the collection was placed some 2,100 feet below the surface and [illegible] with vast hoards of other valuables—money, jewels, and Nazi loot (page 7[illegible]).

Third Army Troops Find Hoard

On April 7, 1945, this tremendous treasure trove was brought to light by the advance of United States troops of Gen. George S. Patton's Third Army.

[illegible] laborers of the Germans, [illegible] of the 90th Infantry Division. Largely by sign language and pointing to the mine entrance, they informed him that [illegible] treasures. He investigated and found literally millions in gold coin and bullion, jewels, and other valuables.

Beyond the boxes and bags of gold and silver the Colonel noticed an old painting leaning against the wall. He did not know it at the time, but this painting was Rembrandt's famous work, "The Man with the Golden Helmet." Three years later the Colonel, on duty near Washington, was surprised to recognize it on the walls of the National Gallery of Art during the exhibition in Washington!

Further search revealed crate after crate of great paintings. These masterpieces and other works of art were then taken over by the Arts and Monuments officers attached to the United States Army.

Thousands upon thousands of notable works of art were found, not only in salt mines but also in storerooms of castles, in vaults of banks, in cellars of monasteries and churches, and in isolated private homes. They had been hurriedly evacuated and stored to protect them from air raids, and now they became a real problem for our Army.

Art collection centers were established at Munich, Wiesbaden, Marburg, and other places. In Munich the two huge modern buildings on the Königsplatz, built to be the headquarters and shrine of the Nazi Party, were used for storing art—a use, incidentally, which was a far cry from the bellicose aims of their builders. In Wiesbaden the museum on the Wilhelmstrasse was chosen.

To these centers rumbled big, well-guarded Army trucks day after day, bearing their precious burdens. These moves were more leisurely—air raids were a thing of the past.

Looted Art Returned to Owners

In the centers the art objects were classified by our Arts and Monuments officers into two categories—German loot, and collections of legitimate German ownership.

The loot was promptly sent back by our Army to the country from which it came. On one day alone a train of 45 freight cars filled with works of art was sent back to France. Hundreds of thousands of looted items were returned to the country of ownership. A magnificent job has thus been done by that branch of our Army known as the Monuments, Fine Arts, and Archives Branch.*

The Kaiser Friedrich collection was trucked first from the Merkers mine to vaults in the Reichsbank in Frankfurt and later to the collection point at Wiesbaden—150 miles from its wartime quarters in the salt mine.

In October, 1945, it was decided to send a part of the great Berlin collection to the United States for safekeeping until better facilities could be made available in Germany.

The collection centers at Munich and Wiesbaden had suffered considerable war damage, little or no coal could be spared to heat them, and there was difficulty in obtaining glass to replace the shattered windows and material to make the roofs watertight.

Moreover, the Army was forced to guard what was probably the greatest accumulation of art ever brought together in one small geographical area.

The United States Zone was filled not only with the treasures of all the important German, Austrian, and Hungarian museums except Dresden, but also with the vast pile of art looted by the Nazis from various occupied countries.

Personnel and Material Scarce

Material such as canvas, varnish, glue, and [illegible] were lacking, and German museum personnel was scattered or still being screened.

On the principle that it is better not to have all your eggs in one basket when the going is rough, as it was immediately after the occupation of Germany, a selection of "some 200 paintings" from the Berlin museums was made upon orders from high authority.

Packing of the paintings for their transatlantic journey was started in the Wiesbaden museum, in rooms piled high with precious paintings, sculpture, and other art pieces.

The progressive intensity of Allied bombing in Berlin was here discernible. The first packing cases made for evacuation of the paintings were of excellent wood, carefully fashioned, with hinged tops, hardware handles, and beveled edges. As urgency increased, plain boxes of flimsy material were hurriedly nailed together. Finally, there were crates in which the paintings were merely piled on top of one another with no pretense of careful packing.

Many of the old, ornate frames were broken beyond repair, and many of the paintings themselves were damaged.

Packing materials for the long voyage were almost unobtainable, but by using the better crates from Berlin and by "scrounging" tar paper from some stock pile, the job was finally completed.

Cameras Record Each Painting's Condition

Of great help was the discovery of a large supply of chemically treated celophane-like paper which the Germans had been using in air raid shelters as protection against gas. This material, proof against fire and water, was used to line each packing case.

* See "Europe's Looted Art," by John Walker, National Geographic Magazine, January, 1946.

[illegible] • *Portrait of a Young Woman*

[illegible]

[illegible] • *The French Commissioners*

[illegible]

[illegible] • Saint George, Saint Catherine, Adventures of the Virgin, Saints James, Saint Michael

JOHN SARGENT SINGER, R.A., R.W.S. (1856–1925) • *The Draftsmen*

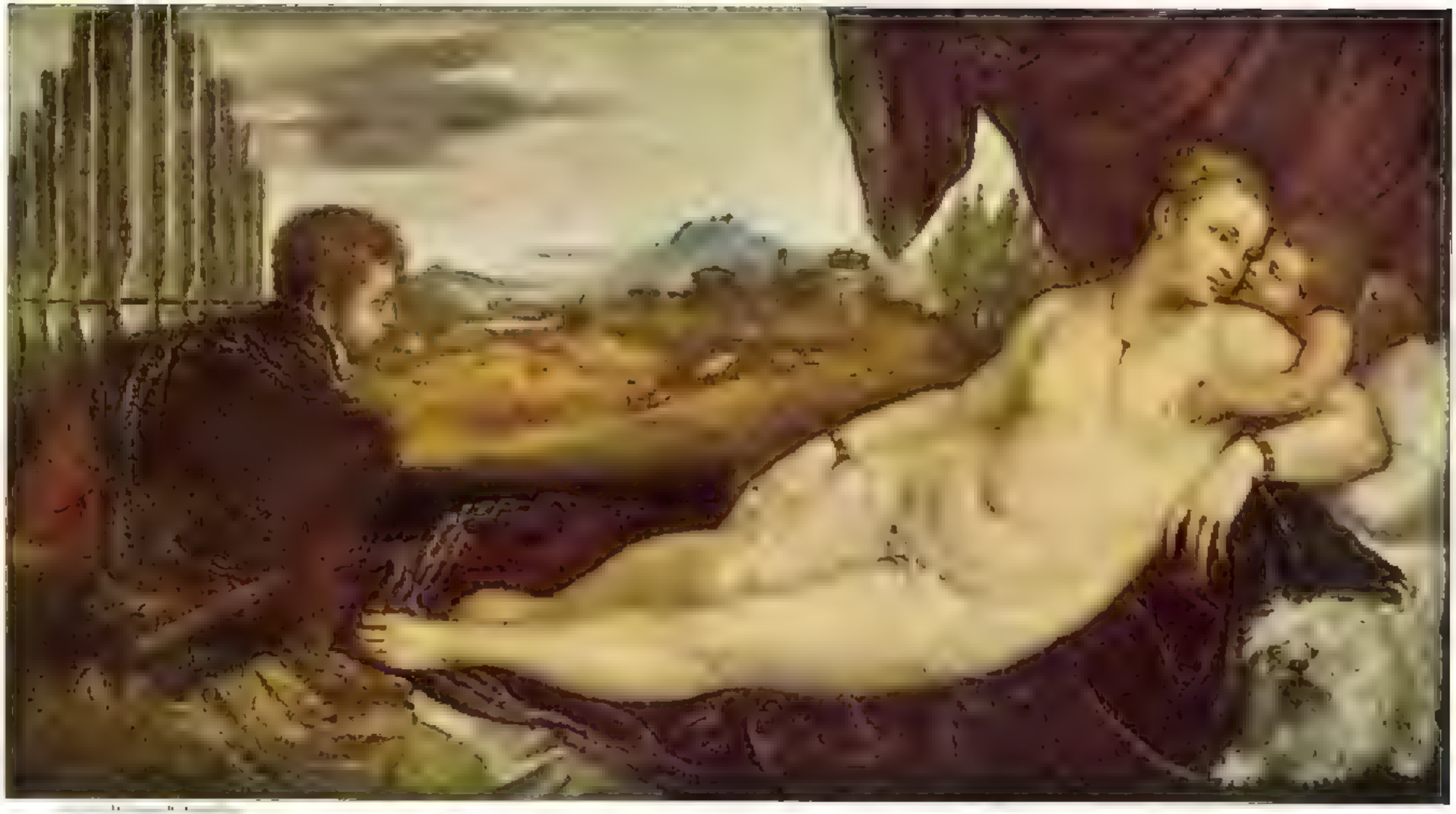
[illegible]

[illegible]

[illegible]

[illegible] • [illegible] Vicomtesse de Sens, [illegible] of the Louvre

[illegible]



[illegible] • *Venus with the Organ Player*

[illegible]

[illegible] • The Greenhouse
[illegible]

[illegible] • Flemish Left Section

[illegible]

Lilies and Cardinal Flower in the Summer Garden by Ito Jakuchu, Edo period, 18th century

[illegible] • *Judith and the Head of Holofernes*

[illegible]

[illegible] A Mantle Girl with Her Nurse

[illegible]

[illegible] — Gonfalone del Vespro

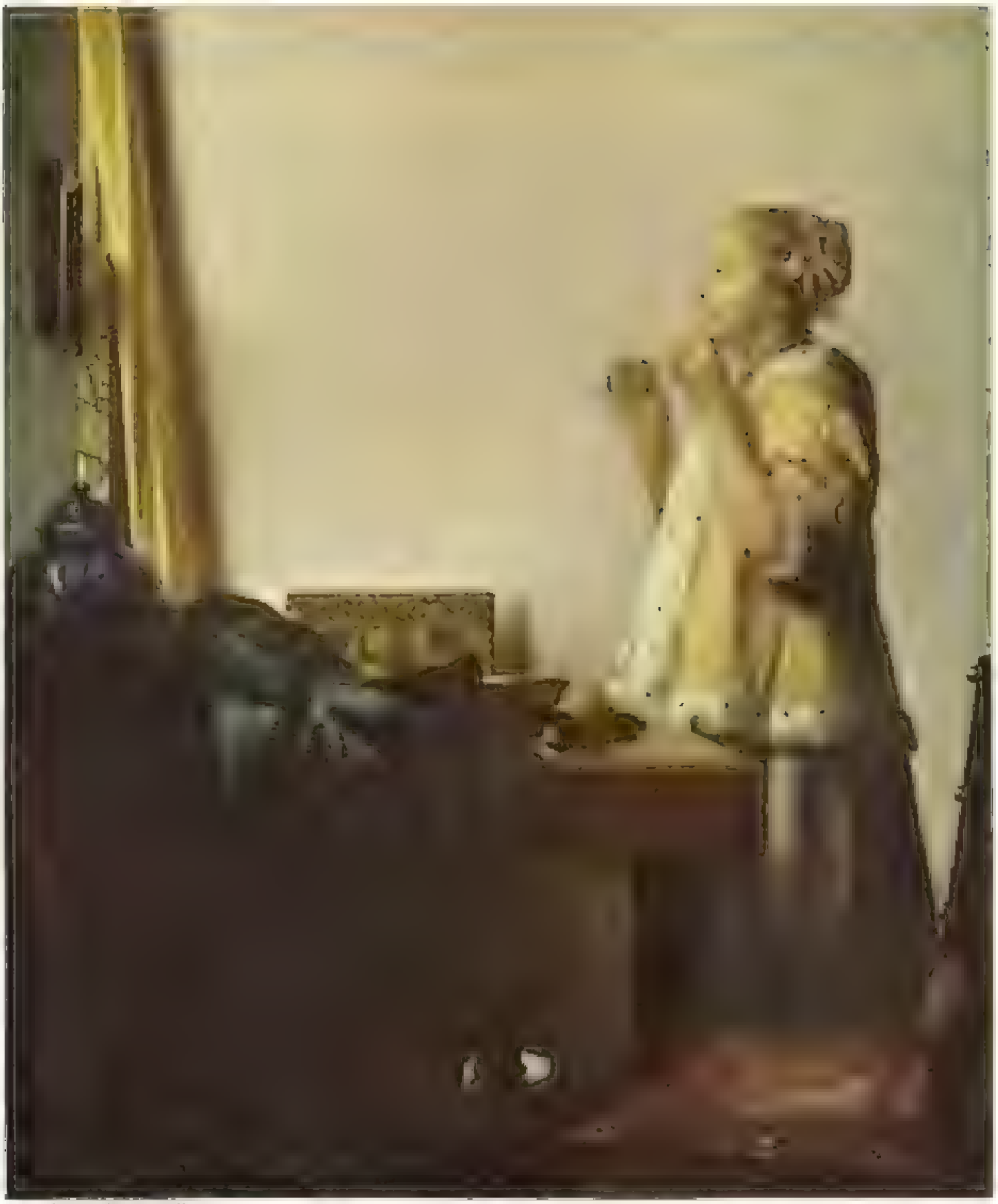
[illegible]

The Man with the Pad

[illegible]

[illegible]

[illegible]



[illegible] • *The Pearl Necklace*

[illegible]

[illegible] • A Road Wrecker Among Clumps of Trees and Small Houses
[illegible]

[illegible] *Perseus Freeing Andromeda*
[illegible]

[illegible] — *Empressa* [illegible] *Party*

[illegible]

[illegible] • *The Chess Player*
[illegible]

[illegible]

A group of German photographers from Marburg took record photos of each painting before it was boxed, to establish its condition as the Army had found it. Thereafter it was up to the Army to protect the collection and to return it without damage or deterioration. There the Army did a superb job!

It was November, 1945. Snow and ice were already present in certain areas; roads and bridges were still in war-torn condition. Wiesbaden was a long way from any seaport. Accordingly, it was decided that the 202 should travel by rail.

Boxcars were out of the question; baggage cars were unheated and often windowless. But in the severely blasted railroad yards at Frankfurt, amid twisted rails, grotesquely shattered locomotives, burned-out freight and passenger cars, we found two German hospital cars bearing large red crosses.

From these the interior equipment had been removed. They could be heated and the windows were intact—perfect parlor cars for the 45 cases of paintings, with room to spare for 10 Army cots for the armed guard which was to accompany the shipment.

Convoyed by truck from Wiesbaden, the paintings were carefully loaded and the two cars were shunted around the city to the passenger station, where they were attached to the "Main-Seiner," the night express to Paris. Thus started on November 20, 1945, the most important transatlantic voyage of art!

Jean Frenchman Finds a Way

The next step was from Paris to Le Havre, and here it looked for a time as if a real snag had appeared. A small French switch engine coupled onto the two cars to take them from the Gare de l'Est to the Gare St. Lazare. The track led through a tunnel. Suddenly, with a whistled shriek of warning, the engine jolted to a halt at the tunnel entrance.

French trainmen waved their arms and shouted. The cars were too big for the clearances. Mon Dieu, what was to be done now? Conferences, measurements, parlemoniant!

Then came a big, muscular foreman who settled the matter with an ax. He chopped off the lower steps of each car, then climbed up on the roof and knocked off the tops of the ventilator heads. The cars went through.

Next stop was Le Havre, alongside the Army transport *James Parker*. Always the paintings were under strict armed guard, night and day. Security measures were perfect.

Hand-carried aboard, the cases were carefully stowed and lashed along one side of the officers' air-conditioned dining saloon, well above the water line.

Here the military police guard was replaced by ten returning soldiers who volunteered for the task of protecting the paintings and also of enforcing the rule against smoking in the officers' saloon. This restriction did not seem to make the German paintings too unpopular with the passengers.

After an uneventful crossing, the ship passed the Statue of Liberty [illegible] December 6, with no visible impression upon Botticelli's "Saint Sebastian" or Van Eyck's "The Man with the Pink" (Plate XVII), or upon the other German-owned masterpieces. Though America was still a wilderness when many of them were painted, they were to discover here an amazingly art-conscious nation.

Unloading at a pier in New York began at seven the next morning. Each crate was hand-carried down the gangplank and carefully placed in two Army trucks and a trailer truck for the trip to Washington. Carpenters built protecting rails in the trucks so that there would be no jolting or movement.

Art Preceded by Shrieking Sirens

Under heavy armed escort in four staff cars with an extra truck and tires in case of emergency, the radio-controlled convoy left the pier at noon.

Like royalty, the masterpieces passed through New York streets and a specially cleared lane of the Holland Tunnel behind police motorcycles with blaring sirens.

Relays of State police led the convoy through New Jersey, Delaware, and Maryland. A special ferry took it across the Delaware River at Pennsville.

The distinguished visitors were met late that night at the District of Columbia line by a Washington motorcycle police escort. Moving through red lights with shrieking sirens, they passed the Capitol and arrived in state at the National Gallery of Art, which was to be their temporary home.

The Gallery staff started immediately unpacking them. On rubber-tired carts the crates were gently moved, one by one, to the large so-called "copyist's room"—an air-conditioned room with red-tiled walls, gray cement floors, and heavily barred windows.

Exclamations as "Assumption" Stands Revealed

It was an exciting moment when the first of the masterpieces was removed from its wrappings in these surroundings. The beautiful "The Assumption of the Virgin," by Andrea del Castagno, appeared in all its golden glory amid exclamations from the curatorial staff (Plate X).

© U. S. Army Signal Corps, 1945

General Patton's Yanks Discover "The Greenhouse" in a Gloomy German Salt Mine

In Merkers, April, 1945, two slaves of the Nazis pointed out to the Third Army [illegible] of art and gold. At [illegible] prepared for [illegible] "almost [illegible]" [illegible] Page 18.

The 202 paintings were minutely examined, again photographed for condition reports, and found to have suffered no damage on the voyage.

The many masterpieces which arrived unframed were provided with strong temporary frames of stained poplar. They were wiped to remove accumulated dust and grime and hung on heavy wire screens.

The policy of the Gallery, as custodians for the Army, was to do everything it could toward safeguarding the paintings, but no restoration other than that absolutely necessary for preservation was attempted. This was thought to be a job for German restorers upon return of the paintings.

Daily inspections were made; temperature and humidity were carefully controlled. Many of the paintings were on delicate wooden panels, some of which had become warped years ago; therefore, it was necessary to handle them with special care.

In the mine, too, they had become saturated with moisture. Had they dried out too quickly, contraction of the wood would have caused blisters and cracks.

The National Gallery could not [illegible] ideal conditions—but the proper readjustment of these panels to normal atmospheric conditions.

To Be Returned in Better Condition

Because of the air-conditioning system at the Gallery, unique among large museums, relative temperature and humidity could be controlled in the copyist's room so that the pictures would lose excessive moisture slowly and safely. From this point of view, particularly, the pictures are in better condition today than when they left Germany.

Some showed incrustations of salt from water which had dripped on them in the Merkers mine. This damage was carefully removed, and so successfully that salt marks are now noticeable on only two of the paint

Monet's Pictures Received by Americans In Spain or Americans in Washington, D. C.

[illegible]

[illegible] Tour of Spain, on March [illegible] by Dwight [illegible] XI-XII [illegible]

[illegible] Spain [illegible] by its [illegible] Spain. But in March, [illegible] the Army [illegible] had to [illegible] return to [illegible] to Germany [illegible] for [illegible] homeland.

The National Gallery of Art was organized [illegible] so that Americans could see [illegible] masterpieces.

According [illegible] special [illegible] the paintings were hung in [illegible] rooms and the collection [illegible] to the public on March 17, [illegible] the [illegible] of the Gallery [illegible]

[illegible] was to Americans [illegible] and [illegible] paintings [illegible] in [illegible] Germany [illegible] with [illegible] and [illegible] to [illegible] the [illegible] of the paintings.

[illegible] in the art world [illegible] March [illegible] on Wednesday [illegible] the Gallery [illegible] of an [illegible] large [illegible] at [illegible]

[illegible] increased

All Attendance Records Broken

On the following Sunday afternoon, several [illegible] were [illegible] the [illegible] 2 [illegible]

The [illegible] passed through the [illegible] the [illegible] [illegible]

[illegible] for the first [illegible] weeks [illegible]

[illegible]

257,228, and still the crowds poured into the building.

The peak day was April 11, the number reaching 67,490, something heretofore unheard of in art museum history (page 718). The show closed on Sunday, April 25th, and a completely exhausted Gallery staff, with the added detail of MP's, had received the astonishing total of 964,970 visitors!

Crowds on many days were so large that the paintings could hardly be seen.

On the Mall side of the building, as many as 22 large buses were parked in one day. Motor coaches brought tourists from Maryland, Pennsylvania, Michigan, and two loads of colored schoolchildren from Birmingham, Alabama.

A busload of art students from Missouri traveled two days and two nights to see the exhibition.

Hundreds of classes came with their teachers from local and neighboring schools.

President Drops In; Comes Again

President Truman, out for his morning stroll, appeared at the service entrance one Sunday morning before the Gallery building was opened. He was shown the collection and enjoyed it so much that he made arrangements to come the following evening with Mrs. Truman and their daughter.

At a press conference later, the President hailed the exhibition and informed the reporters that his preference was the famous portrait of a merchant, "Georg Gisze," by Holbein (Plate II and page 750).

A picture of this great masterpiece immediately appeared in many newspapers, and thereafter special guards were required to handle the crowds that wanted to see the President's favorite.

Special guests were invited to night showings. Senators and Representatives, their wives and secretarial staffs, came, as well as Cabinet officers and high officials of the armed forces. Queen Helen of Romania and Ingrid Bergman, the movie actress, with many other notables, viewed the paintings.

One reason for the exhibition's success undoubtedly is that it was held at the height of the Washington tourist season; the famed cherry blossoms were in bloom. Also, as is the case with all activities at the Gallery, there was no admission charge. The newspapers, too, played an important part in publicizing the event, for this was deemed the most important temporary exhibition of paintings ever shown in this country.

Nevertheless, it remains something of a mystery as to why these paintings should have taken the public's fancy to such an extent. The permanent collections in some of our own galleries—in Washington, New York, Chicago, Boston, and Philadelphia, for example—contain paintings as great and, with few exceptions, examples of the old masters equally superb in quality and quantity.

Time and again the Gallery guards remarked about the orderly crowds, "What fine people these are!" or "Where do all these nice people come from?"

Of course, there were a few visitors like the one who wanted to know where the Kaiser-Frazer pictures were, and one well-dressed man wanted to see the "Hermann" Goering loot!

But most of them were serious in their tour. Delight and even veneration were often reflected in their faces. In most cases, their motive obviously was more than idle curiosity.

Interest became so keen that the exhibition period at the National Gallery was extended one week by the Army. Then arose an insistence by the press, and by many persons in the art world, that more Americans be permitted to see it.

After a request by a subcommittee of the Senate Committee on Armed Services, and after consultation in Berlin with Gen. Lucius D. Clay, Commander in Chief, European Command, and Military Governor, it was decided that these masterpieces should go on a tour of the United States before being returned to Germany in April, 1949.

In each of the cities visited thus far, the paintings are being accorded the same warm welcome extended them in Washington—and, incidentally, are becoming the best-known and certainly the best publicized collection of great art seen in this country.

Most Delicate Paintings Start Home

Before the collection started its American tour, however, it was decided wise to withdraw 52 paintings—especially those on delicate wooden panels "most likely to suffer damage or deterioration" if sent on an exhibition tour and to return them at once to Germany.

Under Army auspices these were packed in 24 crates at the National Gallery. A wealth of packing material and expert care, to ensure their safe arrival, was used. Again they proceeded, on May 17, 1948, under police and military escort to Brooklyn, riding at reduced speed all through the night to avoid daytime traffic.

Special accommodations had been provided for the paintings and for their armed guard on the large United States Army transport *General Edwin D. Patrick*. Inside one of the mul-

Masterpieces Going Home to Germany Are Pampered Like Royal Egyptian Mummies

[illegible]

[illegible] A lock a large "trunk" 21 [illegible] feet had been constructed with [illegible]

[illegible] floor were covered with thick blankets. [illegible] was strung with lights and provided with electric [illegible] temperature and humidity.

Fire extinguishers were placed [illegible] and guards [illegible] were constantly on duty.

Sealed Crates Photographed for the Record

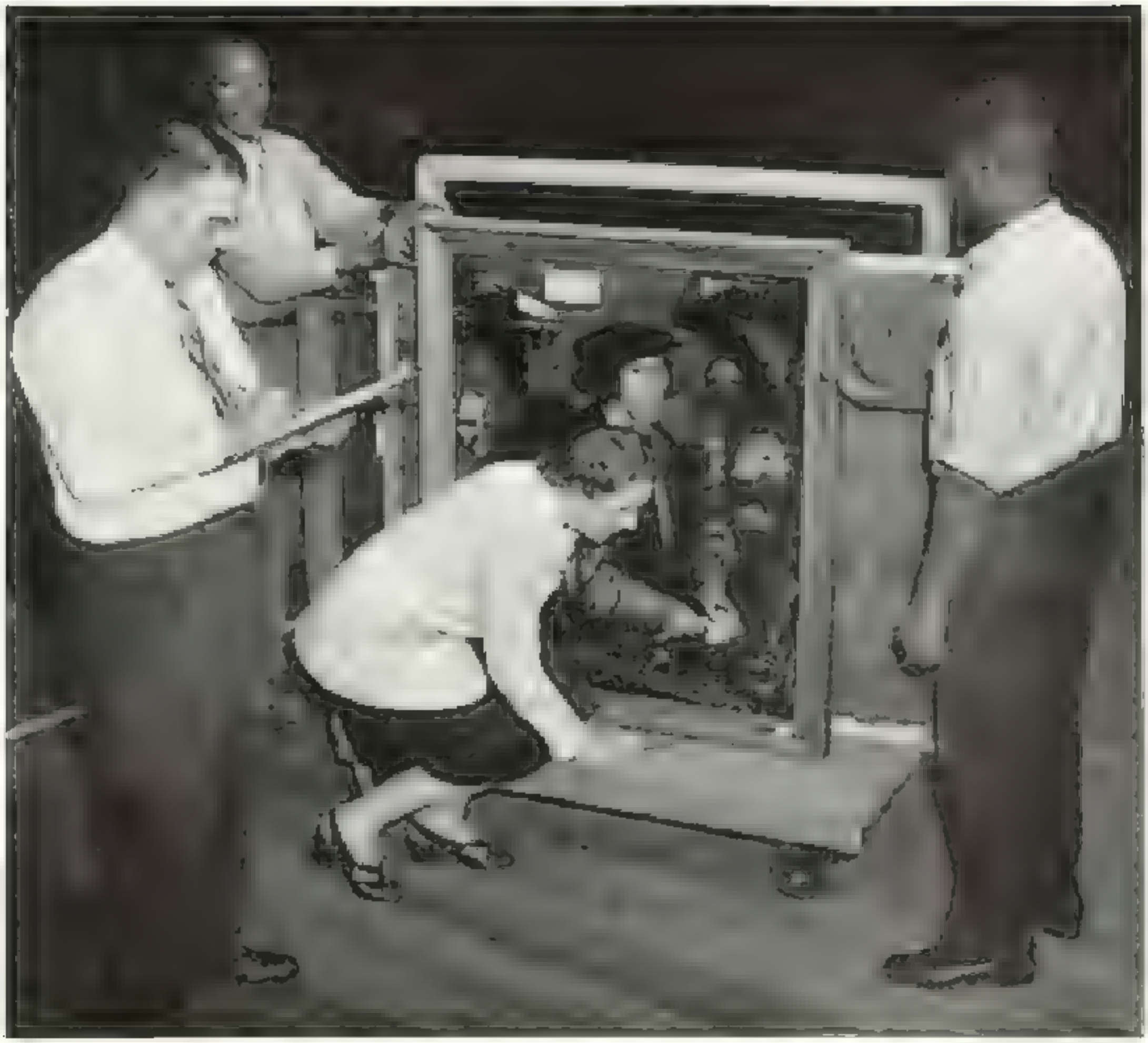
After loading and unloading, Army Signal Corps photographers made pictures of each crate showing the markings and seals. This step was taken to protect everyone concerned from unnecessary precautions. Some crates of the cases weighed more than 500 pounds, yet it would have been embarrassing, to say the least, if the shipment had arrived in Los Angeles or [illegible] Angeles.

This was the situation faced by Bremen [illegible] A [illegible] car and a [illegible] for the accompanying officers and men were waiting.

German stevedores carried the crates [illegible] the ship and [illegible] there in the car [illegible] and heavy wooden props to prevent their [illegible] rolling.

As an added safety measure, an empty baggage car was placed between the precious cargo and the locomotive.

During a [illegible] rain the [illegible]



Curator and Painting, Old Friends from Berlin, Hold Reunion in Washington, D. C.

[illegible] worked in the Kaiser Friedrich Museum [illegible] the Berlin flak tower. As a consultant to the United States [illegible] National Gallery. This picture was [illegible]

[illegible] Nazi headquarters on the Königsplatz.

"The United States Keeps Health"

The following day the [illegible] were [illegible] marked with [illegible] the [illegible] and [illegible] for the [illegible] which [illegible] were [illegible] by this concrete example of how the United States [illegible]

[illegible] of the [illegible]

[illegible] one of Munich's famous modern exhibition halls.

[illegible] in charge of this operation, nothing could have been more [illegible] the return to the United States [illegible]

The paintings arrived without damage. They are in better condition than when they left Germany. Their convalescence in America has done them good.

The Curlew's Secret

By Arthur A. Allen

Professor of Ornithology, Cornell University

[illegible] Expedition to Alaska

With Illustrations from Photographs by the Author

UP TO June 12, 1948, one bird—and one only—of all the 815 species of North American birds had successfully hidden the secret of its nesting place and summer home from the eyes of man.

This bird of mystery was the bristle-thighed curlew, so named because of dubious adornments sprouting from its flanks and even its belly (Plate I).

No bigger than a pullet, but strong of wing, this great little traveler was known to winter on Tahiti and other South Sea islands and in spring to fly 5,500 miles, often by way of the Hawaiian Islands, to the coast of Alaska (map, page 734). But there it seemed to vanish into the thin air of the North.

The story of the curlew's secret begins before the American Revolution with the famous round-the-world voyage of the British navigator, Capt. James Cook, during the years 1768 to 1771. It ends with a 1948 expedition sponsored by the National Geographic Society, Cornell University, and the Arctic Institute of North America, which was organized in 1944 by distinguished Canadians and Americans.

First Specimen Found in 1769

Captain Cook had already demonstrated his appreciation of science, his knowledge of navigation, and his administrative ability when he was selected by the Lords of the Admiralty to sail the *Endeavour* on a voyage of exploration around the world.*

The main objective from the standpoint of the Royal Society was to make observations on the transit of Venus across the sun, which might give information of value to astronomy and navigation. This happens about once in a hundred years and the Society, desiring data from widely separate points, wished the transit of June 3, 1769, observed from an island in the South Pacific.

Tahiti, then called Otaheite, had been visited by Capt. Samuel Wallis, R.N., the year before and was selected as the most ideal [illegible]. Thither Captain Cook directed his course, leaving Plymouth, England, late in August 1768. Sir Joseph Banks, an ardent naturalist, was chosen by the Royal Society to accompany the expedition.

After an unusually well-ordered voyage, the expedition anchored at Tahiti on April 13, 1769, and stayed until July 13. It established friendly relations with the natives and recorded successfully the transit of Venus.

Three months on the island gave Banks and his helpers plenty of time to harvest a representative natural-history collection, and this was made available to other scientists upon the return to England.

Examining the expedition's bird collection, John Latham, a leading ornithologist of the day, recognized a curlew from Tahiti as different from the European whimbrel. When he published his *General Synopsis of Birds* in 1785, he listed the new bird as the Otaheite curlew. Its present scientific name is *Numenius tahitiensis*.

Bristles Noted by Titian Peale

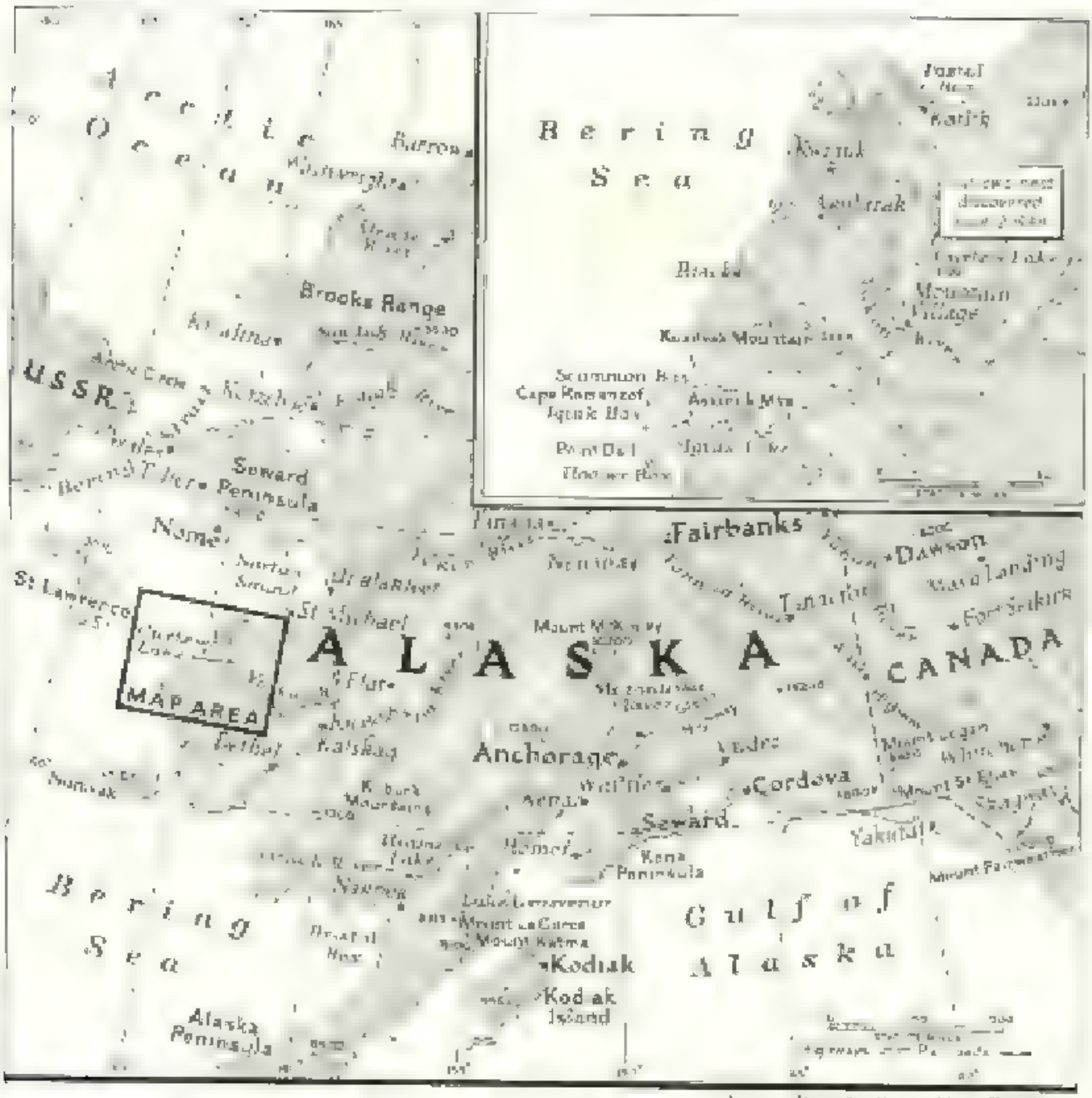
After Captain Cook had shown the way, practically every naturalist who visited any of the South Sea islands between September and April found Otaheite curlews and sent specimens back to the various museums of Europe.

From 1838 to 1842 Titian Peale, son of the artist Charles Wilson Peale, accompanied the United States Exploring Expedition to the South Seas under Lt. Charles Wilkes and found a curlew, in the Low (Tuamotu) Archipelago, which he thought to be a new species. Because he noted curious bristlelike feathers on the flanks and belly, he called it *Numenius femoralis*, and the common name, "bristle-thighed curlew," has stuck to this day.

The bird proved to be the same as the one in Sir Joseph Banks' collection. The characters [illegible] individuals than others—appear to have gone unnoticed by Latham.

For a hundred years after the discovery of the bird, naturalists believed it to be a resident of the South Seas and thought it must nest on some other island than the one they were studying. Then on May 18, 1869, Ferdinand Bischoff collected a bristle-thighed curlew at

* See "Columbus of the Pacific," by J. R. Hildebrand, NATIONAL GEOGRAPHIC MAGAZINE, January, 1937.



Drawn by Harry E. Wilson and Stan H. Alness

Vast Alaska Was the Haystack, a 6¾-inch Nest the Needle

Air transportation and a combination of good weather and judgment and good luck enabled the National Geographic Society-Cornell University-Arctic Institute of North America Expedition to find the best known nest and eggs of the bristle-thighed curlew. This ornithological hide-and-seek ended in one of [illegible]

Kenai, Alaska, across the Kenai Peninsula from Seward.

On May 24, 1880, Dr. E. W. Nelson, who later became Chief of the United States Biological Survey, found two curlews on the west coast of Alaska, near St. Michael.

Five years later, on August 26, Dr. C. H. Townsend found one still farther north on the Kowak (Koluk) River, and it began to be suspected that possibly the summer home of the mystery bird might be Alaska.

Nevertheless, as late as 1896, when R. Bowdler Sharpe published the 24th volume of *Catalogue of Birds in the British Museum*, covering the shore birds of the world, he still gave as the range of the bristle-thighed curlew "Northwestern North America (rarely), visiting most of the islands of the Pacific Ocean, in some of which it is supposed to breed."

Early in the 20th century an increasing number of observations on this interesting bird were made without dispelling the mystery.

Homer R. Dill and William A. Bryan, returning from Laysan Island in the Hawaiian group in 1911, reported about 250 bristle-thighed curlews using the island, and even roosting on the roofs of old buildings in a very unorthodox manner for shore birds.

"Better Take Rations for Two or Three Weeks in Case I'm Grounded by Weather"

[illegible]

In 1923 Dr. Paul Bartsch, Curator of the Division of Mollusks of the United States National Museum, [illegible] the Midway [illegible] recorded these curlews [illegible] and [illegible] November. [illegible]

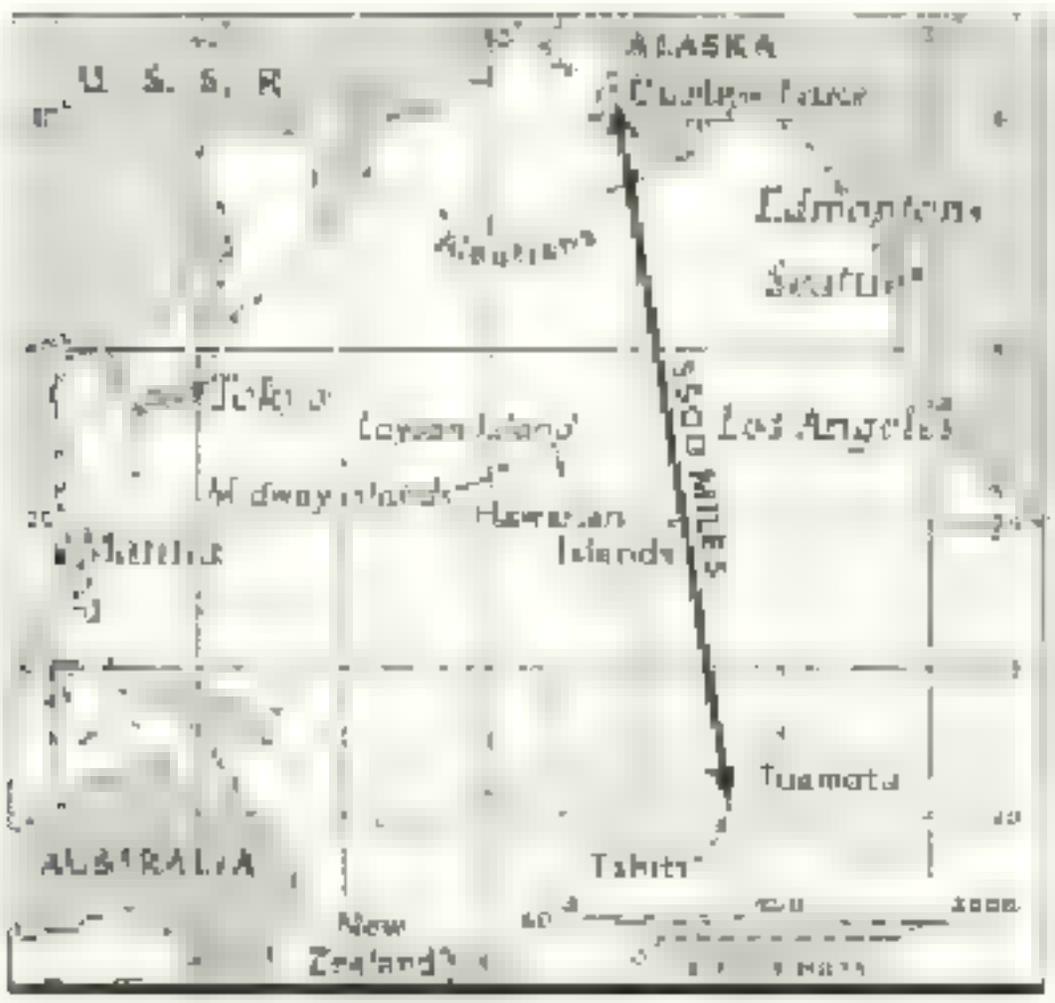
Curlews on Laysan Steal Eggs

The following year Dr. Alexander Wetmore, now Secretary of the Smithsonian Institution and a Trustee of the National Geographic Society, [illegible] Laysan Island [illegible] found the [illegible] eating the eggs of terns, [illegible] birds, and boobies.

The curlews were [illegible] by the presence of the [illegible] Dr. Wetmore's companion, the late Donald R. Dickey, [illegible] a [illegible] Some of these pictures were published in the National Geographic Magazine for July, 1925, accompanying an article by Dr. Wetmore, "Bird Life Among Lava Rock and Coral Sand."

Sometimes the curlews [illegible] the eggs [illegible] more often they carried them away in their bills to break them on the sand.

So far as I know this is the only [illegible]



From South Sea Isles the Curlew Flies 9,500 Miles to Bleak Alaskan Tundra

anyone has ever seen any shore bird eating the eggs of other birds, and we are at a loss to explain how the habit may have developed.

The curlews were often accompanied by ruddy turnstones, which also departed from all shore bird tradition by plunging their bills through the eggs of terns.

Meanwhile, these curlews continued to turn up in Alaska. In August, 1911, Rollo H. Beck collected a series of the birds about Nome, although farther to the northwest, around Wales, Alfred M. Bailey, Director of the Colorado Museum of Natural History, got but a single bird in some twenty years of collecting.

In 1924 Herbert W. Brandt, of Cleveland, and Henry B. Conover, Research Associate at the Chicago Museum of Natural History, made an 850-mile trip by dog team from Fairbanks to Igiak Bay and Hooper Bay on the Bering Sea, by way of Mountain Village on the Yukon. Their explorations gave us the clues that finally led us to the nesting ground.

On May 22 Conover collected one curlew at Hooper Bay, but saw no more until the last day of July and the first week of August. Then, about twenty miles from the head of Hooper Bay, he found the curlews in abundance. They had started on their fall migration. Several hundred were seen scattered over the tundra, feeding on blueberries. All were adults without young, as is usual with shore birds starting their southern migration.

This discovery led Brandt to surmise that the nesting ground might be "at the eastern end of the Askinuk Mountains, or on Kusilvak Mountain, and perhaps the mountains to the northward of Mountain Village on the Yukon River" (map, page 752).

In 1929, however, Arthur C. Bent, in his monumental work, *Life Histories of North American Shore Birds*, summarized what was known at the time by writing:

"The above facts would seem to indicate that the main breeding grounds are somewhere in the interior of extreme northern Alaska, probably on the barren ground."

Added weight was given to this belief when David Brower collected an immature bird on the Meade River in northern Alaska in August 1943. E. L. Jaques had found adults near Teller, northwest of Nome, in July, 1928.

On the other hand, Ira N. Gabrielson, while Director of the Fish and Wildlife Service, visited Alaska in 1940 and reported flocks of curlews around Naknek and the Kvichak River the last of July.

This was the status of our knowledge in the fall of 1947. The nest and eggs of all other North American birds had been found; this curlew alone defied the ornithologists.

About this time I received a friendly letter from Warren M. Petersen, an Alaska Native Service schoolteacher at Kalskag, on the Kuskokwim River. He wrote me of his interest in birds and of efforts that he and Henry Kyllingstad, teacher at Mountain Village, had made to find bristle-thighed curlews.

In the summers of 1946 and 1947, following the suggestions of Brandt and Conover, these two men had searched in vain the eastern edge of the Askinuk Mountains. Earlier, Kyllingstad, with his small son, had climbed to the top of Kusilvak Mountain without getting a clue to the whereabouts of the curlews.

Expedition by Plane Proposed

Petersen suggested the possibility of employing local bush pilots for transportation from one lake to another after melting of the ice in June. He sent photographs he had made the previous year and convinced me that even a one-month trip might yield results of interest and value.

Alaska was one of the objectives listed in the general plan of bird study which the National Geographic Society's Committee on Research had tentatively approved, and the quest of the unknown had occupied the Cornell Laboratory of Ornithology for years.

I immediately wrote Dr. Gilbert Grosvenor, President of the National Geographic Society, suggesting a cooperative expedition with Petersen, Kyllingstad, and the Arctic Institute of North America to find the bristle-thighed curlew's nest. By return mail this proposal received Dr. Grosvenor's cordial approval.

Then ensued weeks of correspondence with Petersen and Kyllingstad, made simpler by

Jumping off Place for the Clarkson Quest Was Mountain Village on the Yukon

[illegible] here nearly a mile wide [illegible] that its channels phosphoresced white [illegible] Black [illegible] and absorbed light. The nest was found 20 miles north of the Eskimo [illegible]

the air mail service and by the fact that they could talk to one another by radio although they were more than a hundred miles apart.

One factor worried us more than any other: the weather. Fogs often roll in from Bering Sea and last a fortnight. Flying is then impossible and even tramping over the mountains or tundra may become precarious.

To get color films of the bird life under bad weather conditions, we knew we should have to be prepared with some sort of artificial sunshine, as well as waterproof protection for our equipment. Since all transportation in Alaska would be by air, equipment would have to be light and reduced to a minimum.

Weeks of planning, testing, and packing followed. One gadget after another was tried and discarded; but the total of essential equipment made us decide that it would be best to have my son David start two weeks ahead with the heavy baggage. I would follow by plane as soon as university duties permitted.

David left Ithaca, New York, by train on May 18, bound for Seattle and thence by ship to Seward and train to Anchorage. There he arrived on May 20.

Ithaca to Anchorage in a Day

Leaving Ithaca on May 28, I arrived at Anchorage on the same day as David, but some six hours earlier, after 18 hours of flying.

Beyond Edmonton, Alberta, the plane followed, more or less, the Alaska Highway. We watched the flat, carpetlike wheatlands gradually change to rolling hills covered with light green cottonwoods and birches; then to black spruces for miles on end.

Innumerable ponds and lakes dotted the landscape, and I imagined them teeming with waterfowl, although we were flying too high to see individual birds. The streams were all running full and brown, with more loops and bends than a snake.

Snow-capped mountains began to appear, and we could see the highway winding its tiny thread up valleys and ridges toward a pass. Soon we were looking down on snow-covered ridges through drifting clouds and snow squalls like fine horizontal lines of white.

Swinging southwesterly over the pass, we followed the Glenn Highway down the famed Matanuska Valley to Anchorage, where we arrived at Elmendorf airport shortly after noon.

Anchorage is a bustling little town of about 20,000. It has more than redoubled its population since the last census and gives promise of becoming the metropolis of Alaska.

I like to say that the whole town turned out upon our arrival, and so it did. The demonstration, however, was not for our benefit, but just the response to a fire on the main street. This the volunteer fire department quickly subdued with modern equipment.

Streets were crowded with cars, store windows were full of equipment, building was going on everywhere, and all prices were high.

Birds abounded in the near-by spruce forest, and we heard our first varied thrush's song—a long drawn-out, buzzy policeman's whistle of one note, quite disappointing from so distinguished a bird.

Moose and Grizzlies Sighted from Plane

Next morning we shipped all our baggage by air and boarded the Alaska Airlines' two-motored plane bound for Bethel, with stops at Homer and Naknek.

The pilot flew low along the Kenai Peninsula, which is largely a game reserve. Perhaps he enjoyed seeing moose and grizzlies as much as we did. Several moose had calves—one had twins—and twice we saw five bears within a stone's throw of one another.

On our way from Homer to Naknek, we passed over beautiful Lake Grosvenor, [illegible] at home, and Mount La Gorce, snow-capped and enshrouded in clouds.

From Naknek we followed the low-lying coast and then climbed once more to cross the snow-covered Kilbuck Mountains before we broke out over the tundra marking the delta of the Kuskokwim River, on which Bethel is located. Green trees fringe the river, but elsewhere is only the brown tundra with its thousands of lakes, ponds, and tidal channels like a giant jigsaw puzzle.

At Bethel we met Nat Browne, the bush pilot to whom we were to entrust our lives for the next month (page 753). His muscular frame, kindly smile, and matter-of-fact manner gave us confidence as he showed us the red Bellanca we were to use, anchored in the river in front of his home.

Warren Petersen, who had flown down from Kalskag two days before with his wife and daughter, joined us and showed us the "sights"—a group of houses and other buildings set along the streets at odd angles indicative of their temporary nature. The river changes its channel frequently and the whole town stands ready to move on short notice.

Because the ice never goes out of the ground, no cellars or stable foundations are practicable for even the largest buildings, including a modern hospital. A good jack is part of the necessary equipment of any home.

At 7:30 in the evening Nat Browne flew us to Mountain Village, on the Yukon (page 755)—a 70-minute flight—and landed us at

Tents of the Expedition (Left) Lie Amid a Maze of Lakes and Ponds

David Allen surveys Isaak Valley between foothill ranges of the Askinuk Mountains [illegible] the expedition found scores of nesting birds but no bristle-thighed curlews. Such a labyrinth of lakes is a paradise to waterfowl and shore birds, but a headache to men on foot (page 759).

be front door of Henry Kyllingstad. Henry is not only the Native Service schoolteacher for this area, but the weather observer and radio operator as well.

So far as I could see, this whole country [illegible] who are supposed to know everything and do anything from mending motors to bringing babies into the world and looking after the health of the whole community. Of course they cannot prescribe medicine without first locating the hospital physician and describing to him over the radio all the symptoms of the patient.

Plane Serves as Patrol Wagon

In the Kyllingstad home we were entertained for two days while Nat Browne carried a planeload of natives to one of the canneries on the coast and returned to fly up the river with the local guardian of the peace. On this trip they brought out a native who had gone berserk and attempted to decoy his companion within range of his gun by hooking like a goose!

The delay afforded us opportunity to complete our plans for the curlew hunt, as well as to scour the hills for 10 miles around.

Each May since 1944 Henry had seen a few bristle-thighed curlews passing over Mountain Village, calling as they flew, and so low that when he answered their clear whistle he had been able to make them circle back. Our search yielded us little, however, except a pair of Hudsonian curlews that David located about five miles inland, the nest of a golden plover, and that of a Wilson's snipe, in addition to many nests of hoary redpolls and varied thrushes in the alders.

Discovered, the Curlew Abandons Attempts at Camouflage

A quick dash that flushed the sitting bird first revealed the actual nest of a rare thicket curlew (page 760). The male soon returned to incubate, and [illegible] Later he [illegible] Instead, he [illegible] so accustomed to observers that one could practically touch them [illegible] nest (Plate III).

We planned to make our first trip to Igiak Bay and the foothills of the Askinak Mountains [illegible] the region which had [illegible] Warren and I. [illegible] expected to find the curlews there, but because I wanted to get color plates of the other shore birds and waterfowl for the NATIONAL GEOGRAPHIC [illegible] of using a wildfowl metropolis.

[illegible] to find the curlews until they were surely [illegible] and [illegible]

[illegible] area. It never occurred to me that they [illegible] start nesting, as apparently they did, shortly after the middle of [illegible]

Our plan was to work near Igiak Bay for a week or two days and then to start hopping northward. Avoiding the coastal area that had been combed unsuccessfully by our predecessors, we would concentrate on the foothills of the coast range about seventy miles inland—if we could find a lake on which to land within walking distance of the mountains.

Two or three days at each stop, we hoped would be enough to determine whether curlews existed in the area.

As soon as Nat returned with the Eskimo prisoner, we loaded part of our supplies into the plane and started for Igiak Bay, 80 miles to the southwest. Warren, David, and I were to pitch camp while Nat returned for Henry and the rest of the supplies.

[illegible] the Yukon and over the tundra had an air of [illegible] The [illegible] of cottonwoods and alders along the Yukon passed [illegible] then numerous old flood channels and winding estuaries and finally thousands of ponds, lakes, and channels [illegible] tiny specks on the water.

Engulfed in Cloud Amid Mountains

The [illegible] Mountains, a 2,449-foot cone rising from the flat tundra. [illegible] ridges with projecting castlelike rocks.

[illegible] began to [illegible]

promise of birds and a condition of comfort.

We dashed by a valley that showed a sizable lake hugging the foot of the hills. By shouting and pointing we let Nat know that we wanted to look it over.

All this time the sky had been beautifully clear, although we could see clouds along the horizon, hanging over the tops of the Asklunks.

We came to another pass through the mountains, and Nat banked to circle back to our first valley. All went well until we rounded the first mountain, when suddenly we were engulfed in clouds. It was like jumping into bed and pulling the sheet over your head. We could see absolutely nothing, but we knew the mountains were towering on either side.

Nameless Lake Alive with Wings

Fortunately, we passed out of the cloud and there was our lake below us. Gliding down and banking abruptly, we found ourselves in a flurry of swans that had risen at our approach. On terrified wings they were escaping in all directions. For a moment the air was filled with geese, ducks, and cranes. We had come to the right spot!

The pontoons struck the water and we skittered along for half a mile; then we came back to a quiet mooring on what we now called Igink Lake, since it had no name on the map. Two feet of snow still lay in the alders, and the lake was fringed with ice.

For the first nine days we camped in an open spot in the alders with snow all about us and a rivulet running through the cook tent. We had found a drier knoll for our sleeping tents, a couple of hundred feet up the side of the mountain.

A fascinating week of activity followed. Up early for a good breakfast, we shouldered cameras, tripods, and blinds and were off for the day in four different directions, carrying bars of chocolate for lunch. We explored the dry ridges of the mountains for curlews and the castlelike outcroppings for rough-legged hawks and gyrfalcons.

Henry made one 20-mile hike to the top of the highest peak, looking for surf-birds, but found only snow buntings and Baird's sandpipers that were not nesting in the valley.

One after another, the birds gave up their secrets until we had marked the nests of 44 of the species that dwelt in the valley.

Birds such as the western sandpiper, northern phalarope, Alaska longspur, hoary redpoll, tree and savannah sparrows were so common that we scarcely bothered to look for their nests when the birds fluttered out before us.

Nests of white-fronted, emperor, and cackling geese (Plate V) were plentiful; we found 15 nests of the little brown crane and five of the whistling swan.

Upon finding a nest we wished to photograph, we first marked the spot with high-visibility orange cloth.

To get the birds used to a blind we usually set up a dummy blind, a tripod of three sticks and a shelter half, about twenty feet from the nest. We left it for a day or two, or until the weather cleared sufficiently for photographs, and then [illegible] and set six to fifteen feet from the nest, depending on the size of the bird.

Before long we had eight dummy blinds and three full-sized blinds and were moving with our cameras from one nest to the next, as occasion demanded.

David shared my pack and served as "go-anyster" by tucking me into the blinds and conspicuously leaving the vicinity so that the birds would think the coast clear.

On one of the brighter days I started the morning in a blind by the nest of a little brown crane about two miles from camp. Two hours later, having obtained stills and motion pictures of this bird, I jumped to the blind by the nest of an emperor goose and then to one by a black-bellied plover. I finished the day with a western sandpiper, Salome's gull, old-squaw, and spectacled eider (Plate VII)—the last two in requiring blinds.

It was all very exciting to an ornithologist. Fortunately, the days were long and sometimes we did not get back to camp until seven or eight in the evening, tired and hungry.

The first impression upon starting across the tundra is that of a marvelous springy sidewalk, and we felt we could walk forever without tiring. We soon learned, however, that the moss closed over our boots and formed insidious suction cups. Then there were ponds to ford and marshy spots that nearly pulled one's boots off. By the time we were three miles from camp we realized we were tired before the day had really started.

Watery Labyrinth—and No Detour Signs

Another difficulty was the endless labyrinth of irregular ponds that always barred the direct route back to camp after a long day on the tundra (page 757). With my binoculars I could spot the white tent from afar, but as soon as I directed my course toward it, I would come to a pond too deep to ford.

There were no detour signs, and I had to learn from sad experience which side of the lake led into another and worse detour. What should have been two or three miles as the crane flew ended up as four or five as the ornithologist plodded.

By the end of the week I had punched two more holes in my belt. I was feeling fine and could tramp two miles without puffing, but then it was time for Nat Browne to return. We had satisfied ourselves that there were no bristle-thighed curlews in this area, though there seemed to be almost everything else.

Nat arrived at 4 p. m. on Friday, June 11, as arranged. We were scarcely expecting him because clouds hung low on the mountains.

In the first planeload went Henry and David, with half the equipment, bound for Mountain Village to pick up supplies and then to fly to a lake about twenty airline miles north of the town. Camping there for two days, David and Henry could explore for curlews until Warren and I arrived Monday on Nat's second trip.

When the pilot returned for us, he lifted his plane over the Askinuks, followed the shore of Scammon Bay, with its high cliffs, then flew over the pond-filled tundra, across the coffee-colored Yukon, and finally to what we christened Curlew Lake at the base of a low range of mountains.

As we glided down, we spotted the white tent and the two boys on the shore.

Behind the tent the mountain rose at a 60-degree angle, but from a height of 2,000 feet we had seen a whole series of barren, desolate ridges beyond. The lower face of the mountain was a tangle of alders, but toward the top it was typical tundra with patches of snow still defying the sun.

163-year-old Mystery Solved

"What news?" I called as the red Bellanca taxied up to the shore. We were planning merely to take on supplies and head for the next lake.

"Seen any curlews?" I queried, half facetiously, as neither Dave nor Henry replied.

I saw them exchange peculiar glances, and I expected one of Henry's Swedish stories or some joke from David. They apparently had a story, and perhaps they had rehearsed it. Something misfired, however, as it often does in times of excitement, and out it came—"*We have found the curlew's nest!*"

Who said it? I looked from one to the other in amazement. There was such a degree of sincerity and pent up feeling in the simple little statement that I didn't for a moment doubt its truth. There was no question; the 163-year-old mystery had been solved. They had found the summer home of the bristle-thighed curlew; they had seen the actual nest.

I can't remember getting out of the plane. I can't remember any incidents of the landing, but that story of the discovery, as it unfolded in the next few minutes, is as clear to me now as if I had been there myself.

Nat Browne had delivered the two boys at the Lake at 11 p. m. on Friday, June 11, and they had pitched camp in the afterglow of a sun that had just passed below the horizon. From the air they had seen the ridges behind the mountain and had decided to explore them the following day.

Next morning they were up early and climbed to the top of the ridge behind camp. David started south and Henry north, along the plateau behind the mountain, skirting the alders and scrutinizing the open areas.

Two hours from camp, when they were perhaps a mile apart, they heard, at about the same time, a peculiar whistle, somewhat like that of a black-bellied plover—"Pu-wit"—and spotted a curlew flying toward David.

Henry had heard the bristle-thighed curlew in previous years as it flew over Mountain Village; David was familiar with the Hudsonian curlew from Churchill on Hudson Bay. Neither one doubted they had found the long-sought bird. They froze in their tracks.

The curlew circled and set its wings for a level, plateau-like area a mile away. This area differed from most of the tundra in that it had some broken rock protruding and had numerous clumps of black lichen spotting its surface like shadows.

Hours of Watching, Then a Dash!

A couple of hours of intense watching with binoculars ensued. Meanwhile the watchers kept out of sight, but drew steadily closer.

The curlew was plainly more interested in this one piece of several acres of tundra than in any other. Even after long sorties, he kept coming back to it.

Occasionally a parasitic jaeger, a hawklike gull, would skim over the tundra. The curlew paid little attention to it until it approached a certain place. Then he would call excitedly and fly at the jaeger and drive him away.

There was now little question in the boys' minds that they had found the curlew's nesting ground. Somewhere before them the female bird was sitting on her long-sought eggs.

After spending years hunting birds' nests one develops an understanding of bird behavior. Gradually, as he watched the guarding curlew, David eliminated one spot after another until he felt he knew just about where the nest should be.

Even so, it is not always easy to find the actual nest. Sometimes when a bird sees an enemy approaching, it will sneak off its nest and flush ostentatiously from quite a different spot. Again, the bird will freeze and rely upon its

A Bird of Mystery No. 1—the Brush-thighed Curlew in Its Mexican Home

▲ From the Newly Discovered Tomb Emerged This Dainty "Piece of a Kind"

[illegible]

▼ End of a Long Quest Came with Finding of These Four Tots

[illegible]

Protectively Colored, the Motionless Bird Was Invisible Three Feet Away

Warren M. [illegible] Photo, National Geological Society

First Nesting of Its Kind To Be Seen by Man

[illegible]

Spotting the Bird, Then Watching It Closely, Two Men Made Ornithological History by Finding This Beautifully Hidden Curlew's Nest

A Protected Canada Goose Nests Beside a Nameless Alaskan Lake

▲ This Visitor from Russia "Wigwags" as She Walks

▼ Her Mate Is a Cheesy Fellow, Hence the Name "Pectoral Sandpiper"

▲ To Make a Large Hole Beneath Her Stone Doorstep

▼ A Duck with Glasses Lines Her Nest with Eider Down

A Crane with a Stolen Guards Two Large Eggs on an Alaskan Hillock

[illegible] of the northern waterfowl and is probably acquired from the pond in which they frequent. [illegible] nest. Thus the crane [illegible] parasitic jaegers—hawkbills gulls. [illegible]

protective color to escape detection (page 758).

David had no way of knowing how bristle-thighed curlews would react. There is one technique, however, that is often effective when nothing else works—surprise. If a bird can be faced with an unusual situation suddenly, its reaction is likely to be less favorable to itself than if it has a moment's time.

David removed his rubber boots lest they impede his actions, beckoned to Henry, who had now moved up to the same side of the promised land, and sprinted the hundred yards that intervened between him and the chosen spot.

The reaction of the bird was as he had hoped, and the result is now history. She flushed twenty feet in front of him, and he found the curlew's nest.

In the nest were four eggs nearly as large as those of a domestic hen. Dull greenish with spots of gray and dark brown, they blended well with the tundra (Plate III).

The nest itself was a mere depression beside one of the clumps of black lichen and a mat of Alpine azalea (*Loiseleuria procumbens*). It measured 6¾ inches across and 2½ inches deep and was very smooth at the inside, though made of the surrounding reindeer moss and grasses which ordinarily present a rough appearance.

Birds So Tame No Blind Was Needed

After finding the nest the boys hurried back to camp, fearful lest the jaegers should steal the eggs, and returned with blinds and cameras. They did not realize that no blind would be necessary for a bird that perhaps had never seen a human being at close range.

Since many of the South Sea Islands, where these birds winter, are uninhabited, and since not even an Eskimo would visit this forlorn bit of tundra, we were doubtless as unusual to the curlews as the curlews were to us. We set up a mutual-adjustment society, the birds scrutinizing us as closely as we watched them.

We soon discovered that the eggs were already pecked and the young birds could be heard peeping inside the shells. This perhaps helped to tame the curlews because birds' attachment to the nest is strongest at the time the eggs are ready to hatch.

Since we needed a specimen to deposit in the United States National Museum, to serve as the type, it was necessary to take one of the eggs immediately and remove the chick through a door in one side.

In the meantime, we located another nest. After seeing this second pair of curlews on the tundra, we spent hours dragging the area with a rope and scrutinizing every depression before Warren Petersen finally spotted the incubating bird. Flattened on her nest three feet in front of him, she matched the moss and grasses so well that at first he wasn't sure whether he was looking at a bird or just another piece of tundra (Plate III).

In the second nest the jaegers had stolen two eggs and a third had a large hole in it. The fourth was pecked and ready to hatch, like those in the first nest. What worried us now was the danger that the jaegers might get the remaining egg, or even all those in the first nest, before we could see and record the downy young.

An Ornithologist "Mothers" a Curlew

We were [illegible] nest to the nest, where we could take turns [illegible] would be easier to carry one of the eggs back to camp and hatch it in an incubator.

I had in mind my experience in Quebec, where I successfully mothered a baby red-throated loon in my sleeping bag.*

Returning to camp, I heated stones over our gasoline stove, wrapped the stones in a towel, and placed them in one of our spare water buckets. I made a nest for the egg out of cotton and an old sock.

At night, instead of getting up every few hours to heat stones, I placed the nest in an empty tin can and took it to bed with me in my sleeping bag.

All the next day I heated stones, and as the little bird squirmed inside the egg and its tiny "egg tooth" gradually cut through the shell, I helped it along with judicious use of forceps. I wanted it to emerge without ruining the shell for scientific purposes.

The youngster was not yet out of the shell when bedtime came, so once more I took the egg into my sleeping bag. The following day I had the satisfaction of making the final delivery and claiming for myself the distinction of being the first and only midwife to a bristle-thighed curlew.

In the meantime, I vicariously watched over the nests, the jaegers did not get the eggs, and they hatched normally. The parent birds by this time paid no attention whatsoever to Henry and Warren, who obtained some truly remarkable photographs of the birds with their young and of themselves less than a foot away (Plate III).

During this time David covered many ridges and, though he found no more nests, he saw a total of about twenty bristle-thighed

* See "Sea Bird Cities Off Newfoundland's Labrador," by Arthur A. Allen, National Geographic Magazine, June, 1935.

Dr. Allen Seeves as "Midwife to a Curlew"

[illegible] the National Museum, Washington, D. C. Taken from [illegible] stole incubator and the warmth of his sleeping bag [illegible] Six hours [illegible]

curlews. This indicates that the area we discovered is undoubtedly a part of the main summer range of the species, which may extend northward for several hundred miles, and even into the foothills of the Brooks Range.

Why these birds [illegible] warm, luxurious shores of Tahiti and the other South Sea Islands, fly 5,500 miles over the open sea, and arrive at one of the most [illegible] of tundra in North America, [illegible] and still breed [illegible] hard to understand. •

The rest of our trip would have been quite [illegible] not been that we were working with such exciting birds—a whistling swan, Pacific golden plover, and an emperor goose that became as tame as the curlews.

Since there was no need of continuing northward up the range, Nat Browne flew us back to Ignik Lake, where we had felt so much uneasiness. The next day it rained, and it kept raining for a week, with hardly a break in the clouds.

Back to Civilization Just in Time

The following Sunday it cleared, and we had a full day with our cameras before the plane came for us at 6 p. m.

On the first trip Nat took Warren and Henry and most of the baggage back to Mountain Village.

"Hope you kept out your sleeping bags," he called as he left.

It had an ominous sound, but the sun was still shining brightly, although we did notice a few clouds peering over the Askinuk [illegible]

[illegible] We dragged [illegible] of the equipment into the plane, motored across the lake and up over the mountains, and then discovered the reason. A great sea of fog concealed everything.

Overhead the sun shone as brightly as ever. [illegible] minutes later our valley would have been filled with clouds, and we would have been stranded without provisions or sleeping bags.

How serious it might have been we did not learn until after we had returned to the states. Then a letter from Warren Petersen told us that we were the last people to move and that for two weeks thereafter all planes were grounded.

Lascaux Cave, Cradle of World Art

By Norbert Casteret

How [illegible] Neanderthal people [illegible] Magdalenian [illegible]

IN THE hills of Dordogne, France, prehistoric caverns riddle the soft rock like holes in a cheese. Beside the little River Vézère the Lascaux Cave has surpassed all others in one respect. On its walls, fresh as the day cave men of at least 30,000 years ago outlined them on the rugged rock, is the finest collection of prehistoric drawings ever found.

This realistic art, done from life, shows what vast changes have come since Old Stone Age artists recorded subjects familiar to them but now unknown within a radius of thousands of miles.

Savants, provided with such new data, strive to solve the secrets of ages compared with which those of the Babylonians and the Pyramid builders are almost modern.

With Dr. Maynard Owen Williams, of the National Geographic Society, and his charming wife, I rode south across France to see these wonders for the first time. A cold wave had frozen the gutters of Paris, and beside the winding Vézère shaggy stalactites of ice glittered in the weak sun of January. It reminded me of a day when we had swum in glacial waters at Montespan, 26 years ago (page 776 and map, page 774).

Out of the Mouths of Children

"Wise men," I said, "are delving deeper into the long-forgotten secrets of prehistory. But it was out of the mouths of youngsters that the first announcements of much prehistoric art have come."

"You know," exclaimed my American friend, "that is a story! You have spent most of your life squirming through this prehistoric underground. You have a tremendous following among French youth. You are the one to tell it.

"But before you describe the wonders of Lascaux, you might tell how children, even grand schoolboys, helped discover such high-brow relics of low-browed cave men."*

So here it.

France, rich in prehistoric caverns, was the cradle of all art. It shares with Spain those magic Pyrenean grottoes upon whose rocky walls Old Stone Age men left sketches and paintings. Today they are important clues to man's beginnings. These prehistoric art treasures, relics of the Aurignacian and Magdalenian epochs,† go back 15,000 to 30,000 years. Prehistorians study these ancient records—and sometimes discover new grottoes themselves.

But through curiosity, love of adventure, and unsuspected talents for observation, mere youths have endowed the solemn science of prehistory with sensational finds.

These amateurs have not been able to interpret the secrets of the past, but they have often pointed the way to new wonderlands.

A Little Girl Leads the Scientists

In Spain, a certain Marcelino de Sautuola, a lawyer, had a passion for prehistory. In 1879 he was digging away in an obscure cave not far from Santander.

Its name, Altamira, until then hardly known, has since become a household word.

One day, fateful in the epic of man's gropings toward the dawn of time, Sautuola took his little daughter into the spooky hole.

Soon tired of watching her father scratching away, Maria stretched out on her back. Perhaps peopling the shadows with creatures of her own dreams, she looked up at the cracked and pock-marked ceiling above her.

Suddenly she cried out that she saw, painted in red and black, the forms of bulls.

Busy with his own dreams, Sautuola paid little attention. For some years he had known many crannies of the retreat. Of course no painting of this kind decorated its vault. Shadows perhaps, but nothing more.

But an excited child is not easily hushed; so he looked up. The fame of the wonders he then saw was to sweep the world.

Sure enough, there were the outlines of "bulls" or, on closer observation, bison, whose high-humped shoulders admitted no mistake. The lawyer-archeologist looked long at this vivid mural. He had never noticed it, because, in order to see it best, the observer must get away from its irregularities.

* See "Parade of Life Through the Ages," by Charles R. Knight, National Geographic Magazine, February, 1941.

† The Aurignacian epoch, noted for its well-defined flints, was so named by Abbé Henri Breuil from the French cave of Aurignac. This epoch corresponds to that of the Cro-Magnon (Great Stone) Man, perhaps 20,000 years ago. About 6,000 years later came the Magdalenian epoch, whose culture [illegible] from Spain to Siberia. It takes its name from a rock shelter near the monastery of La Madeleine near Tarascon. In this article the author uses a conservative chronology. Some authorities date the Late Old Stone Age as long ago as 100,000 years.

Man Sorbet & Costcut Steals Light on a Prehistoric Cow

[illegible]

[illegible]

[illegible] could have [illegible] pictures [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

A Child Crawls Underground

[illegible]

[illegible]

[illegible]

This Big Red Bovine Is Deformed by Wall Slant and Perspective

[illegible]

[illegible]

Vacation Days Well Spent

[illegible]

In Three Clusters of Wonderful Caves, Prehistoric Man Left the Finest Known Old Stone Age Art

While the valleys of the Vézère, the Ariège and the Beaume were forming, water carved grottos in the calcareous rock. Eons later, for reasons still unknown, men carved and painted the cave walls with animal figures and an occasional human being. In the area of Les Eyzies (inset) is prehistoric art more numerous. Greatest of all, so far, is the Lascaux Cave in cave-riddled Montignac, above the quiet [illegible] of Montignac. Places marked with an open square are cave locations.

"Drawings! The whole wall is covered with them!"

Leaving his plane table, calipers, and pencils, the retired engineer ran to join his son.

There was no doubt about it. His youngster, Paul, had just discovered—after how many millenniums?—a herd of bison, horses, stags, and young bucks in this grotto of Niaux now recognized as one of the most noteworthy in all the annals of prehistory.

High School Boys Find the Famed "Clay Bison"

[illegible] years later, another father and his three sons were gathered outside a cavern in the Ariège, called the Tuc d'Audubert.

[illegible] a stream poured forth from this hole, the cavern had never been explored.

But on this July day in 1912, Count Bégouën and his sons Max, Jacques and Louis, high school students at Toulouse, decided to cruise up the subterranean river in a homemade ship of fortune.

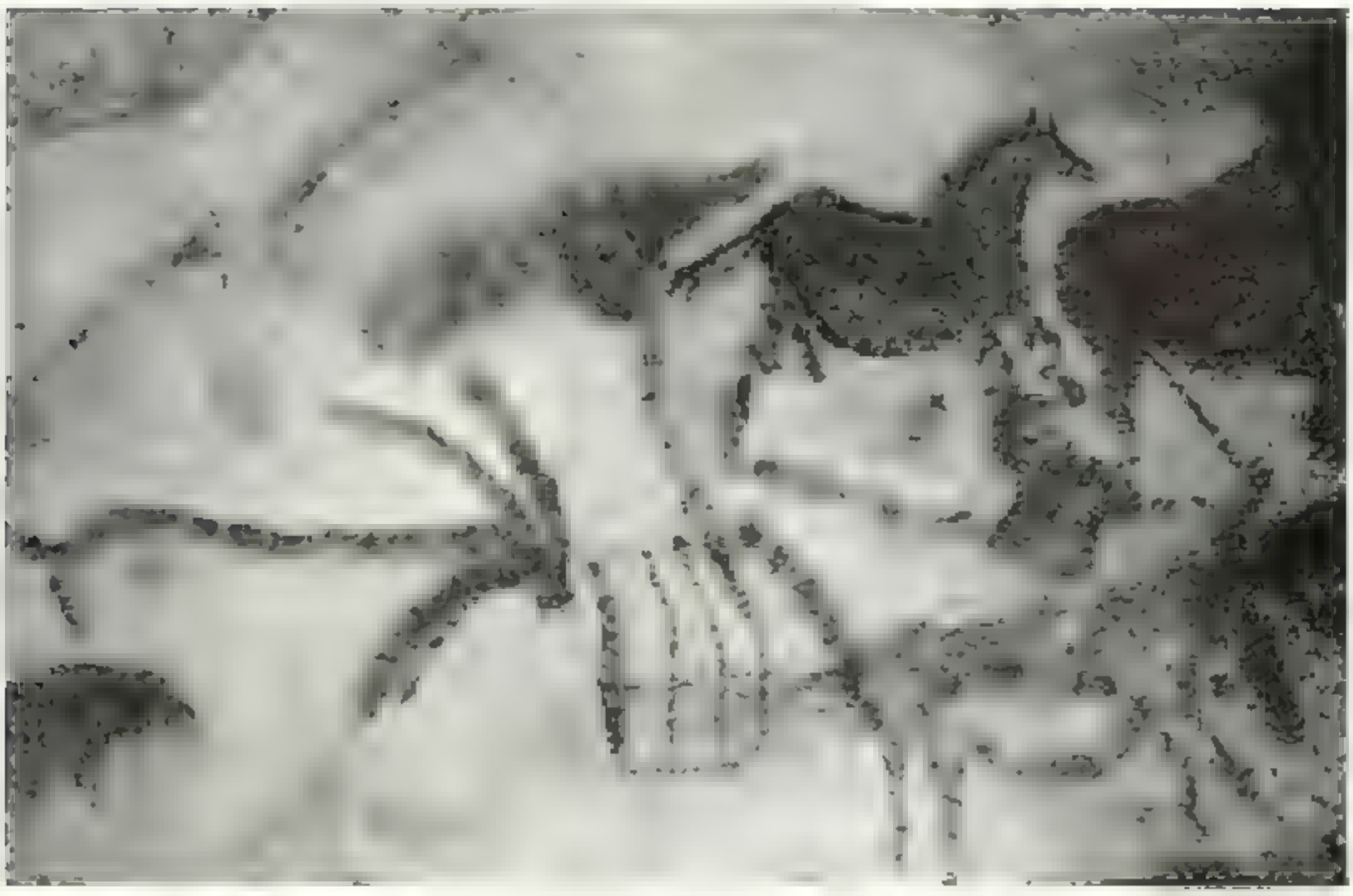
Since they did not know into what they were headed, they advanced with caution. Slowly they floated along on the black water. After a winding and thrilling voyage, they left their boat to proceed on foot. The narrow corridor soon spread out into a vast chamber, its high ceiling glistening with dazzling stalactites.

The adventures of the day had surpassed all expectations, but the job was only begun. Tempting avenues led off in all directions.

One must know the fascination of such adventures carried out in the bowels of the earth, to realize that from that day forward the whole world of the three amateur speleologists centered in the Tuc d'Audubert grotto. Their true love was a hole in the ground.

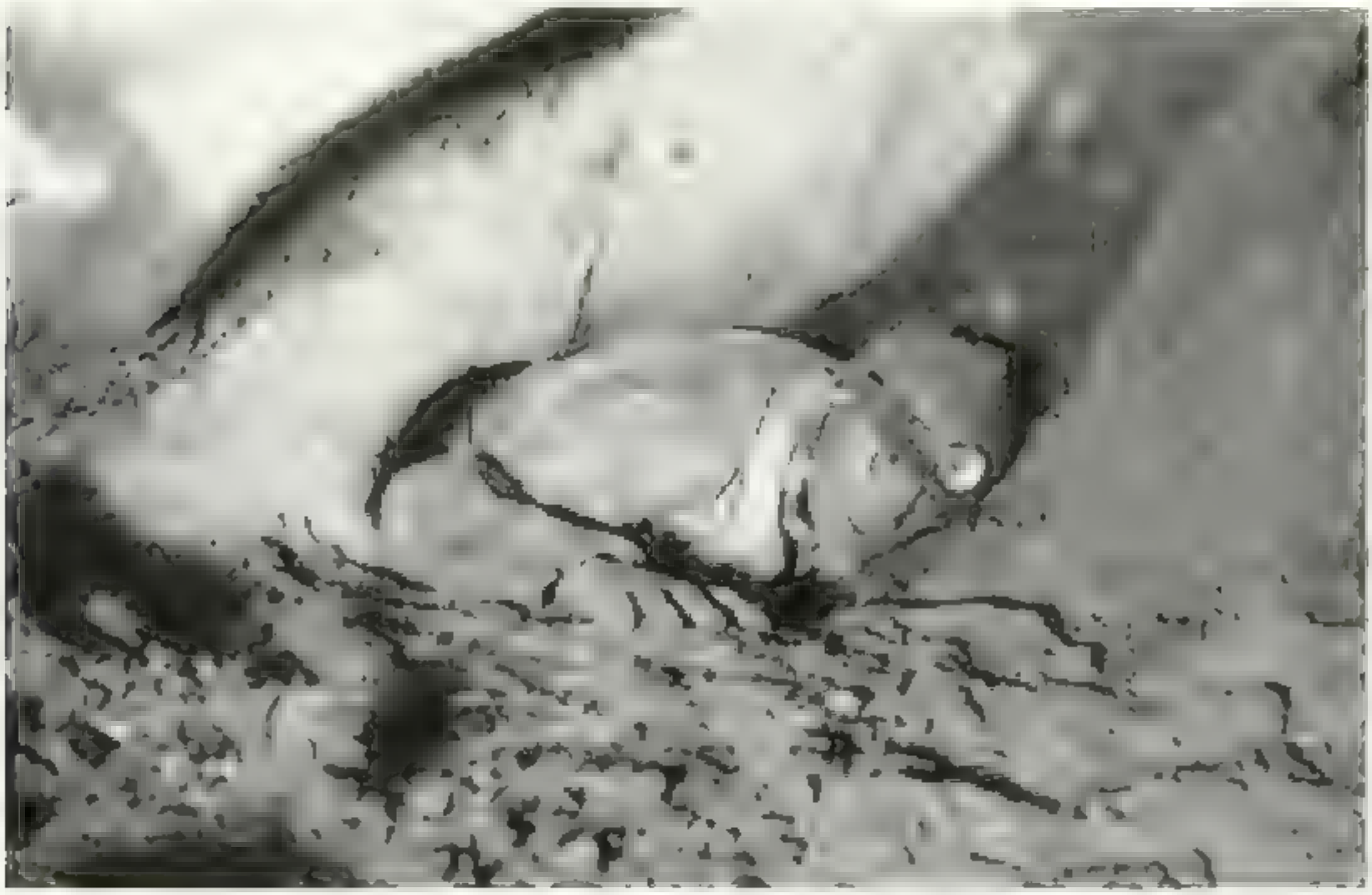
One October day in 1912 when they had scrambled up a steep chimney, they found themselves in a small chamber from which there seemed to be no exit. But one of them, sticking his lamp between two heavy pillars which had almost grown together, found that the gallery went on.

After breaking away the restricting columns, the young explorers squirmed [illegible] that on



Prehistoric Artists of This Region Often Pictured Horses

[illegible] the left appears drawn in flight [illegible] the other one at right b[illegible] of paint [illegible] Scientists do not know the meaning of the [illegible] rectangle, [illegible] [illegible] at [illegible] It may have a [illegible] with [illegible]



An Underworld Explorer Crawls Into a Worm to Reach Subterranean Galleries

The author's most thrilling entry to one cave (Montespan) was made alone, [illegible] swimming the [illegible] flooded by glacial water, with matches and candle [illegible] and in [illegible] a miner's lighting cap [illegible]

their bellies. Climbing with great difficulty, they came to the end of this "rathole." Standing erect, they advanced through a vast cavern.

Suddenly they stopped in front of two superb bison modeled in clay, two masterpieces of prehistoric statuary, the work of Magdalenian hunters.

The excited boys hastened to tell their father.

All four at once set out for the cave. Again they had to embark on the underground river, scramble up the steep chimney, and squeeze into a crooked gallery through whose throat they could pass only by crawling on elbow and thigh.

The slender lads were able to squirm through, but the tall figure of Count Bégouën was too much for the rocky gullet to swallow. Try as he would, he could not pass.

His sons, safely beyond the obstruction, hauled on his arms. Little by little the passage was made without broken bones or scraped skin. But it was by so close a margin (and I can vouch for this point, since I got the facts from the stately hero himself) that, puffing heavily but safely through the hole, Count Bégouën noticed that his trousers had remained behind.

The Bégouën Boys Do an Encore

Two years later, close to the cave of the clay bison, the Bégouën boys noticed a natural well which might communicate with the adjacent cavern.

A sounding line showed a depth of less than 70 feet. They unrolled their rope, and the eldest of the boys, with the help of a companion named François Camel, let himself down into the abyss.

Half an hour passed. Three-quarters. Still no sound from below. As Jacques and Louis anxiously prepared to descend, joyous shouts rang through the woods.

Covered with mud and with their clothing torn, Max and Camel arrived happy as larks.

Said they: "The well does not connect with the cave of the bison at all, but with another, big and beautiful, decorated with prehistoric drawings. From there we crawled into the light of day."

Everyone was happy. Still another cave with prehistoric paintings on its walls!

"Splendid!" said Count Bégouën. "Since this cavern has no name, I name it, in your honor, the Cave of the Three Brothers" (Trois Frères).

Among the many splendid paintings on its walls is one of a dancing sorcerer wearing a mask, a silhouette since famous among prehistorians.

Vacation time is obviously a favorable season for discovering grottoes. That is why, one July day in 1922, a youngster climbed a hill near Cahorets, a dozen miles from Cahors.

A True Explorer at 14

With a candle in his pocket, he deliberately set out to explore a rocky crack he had found. That a mere youth should be doing such a thing may seem surprising. But his catechism teacher, the Abbé Lemozi, was also a distinguished prehistorian. He taught his students the pleasure of underground exploration.

That is why, this Thursday morning, the youngster plugged along toward what looked like an ordinary fox hole. "But," he said, "it *must* be a cave."

The entrance was so narrow that his candle might have burned him, but he squeezed inside and down a steep descent into a high vaulted chamber.

To please his curé, young David had ventured underground. But this cavern was so vast that its very silence was terrifying. Excited, he reported to his friend the curé.

Led by the 14-year-old, the Abbé Lemozi began a complicated and toilsome exploration through a labyrinth in which the small youth had a considerable advantage.

Finally the Abbé and his young pupil entered a cavern as captivating as Ali Baba's. Neither jewels nor gold was their reward, but a procession of mammoths, horses, bison, and bears, carved by flint tools of the Stone Age or painted in red and black.

Thus, a mere youth—on purpose—made a most sensational prehistoric find.

Face to Face with a Faceless Bear

In that same year, 1922, I entered the hitherto unsuspected Cave of Montespan. In a lonesome exploration I followed a subterranean river for nearly two miles under a hill in Haute Garonne.

A 35-page story of this adventure, involving a sightless swim through a water-filled siphon with my candle wrapped in a rubber bathing cap, appeared in the NATIONAL GEOGRAPHIC MAGAZINE.*

The following year I returned, for there were signs that this two-mile underground tunnel might contain relics of prehistoric man.

In those days I had trained a team of four friends in my methods of exploration, and since they were all excellent swimmers, they

* See "Discovering the Oldest Statues in the World," by Norbert Casteret, NATIONAL GEOGRAPHIC MAGAZINE, August, 1924.

Michelangelos of Cro-Magnon Days Decorated This Sistine Chapel of Prehistory

[illegible] the walls and ceiling of [illegible] Cave in central France [illegible] prehistoric [illegible] painted by hunter-artists during the Old Stone Age about [illegible] years ago

A Giant Bull, Portrayed by Prehistoric Artists 8,000 or More Years Ago, Is Obscured by Galloping Horses, Drawn Millennia Later

Calcite Crystals Centuries A-growing Prove the Bull's Head's Age

A Schoolgirl Studies Wild Ponies Now Long Extinct

Kodachrome by Maynard Owen Williams

▲ Prehistoric Artists Knew Their Bison, Gone from Dordogne since History Began

Whether two enemies are coming at a day after combat or turning away to new pastures is unknown. Certainly the humpbacked beasts were painted from life by one familiar with them.

▼ Was the Arrow Slinger Who Scarred This Painting a Vandal or Magician?

What seem carefree scratches may be arrows through which a sorcerer sought to kill his prey. Much prehistoric art was religious when religion was there sorcery. Monsieur Laval's niece shows the scale of the figures.

Marcel Ravidat, Then Seventeen, Discovered This Greatest Gallery of Prehistoric Art in 1940

From the Éditions Gonzague, an Anthropomorphic Bison gazes over Germaine Marchet's head. Above, the Mammoth, the horse, rhinoceros, a horse-headed bison that represents a ship. Rough walls and darkness complicated the artists' task.

Standing in the Dark Void of Lascaux, the Jovial Conservator and His Pupils Are Revealed by Blinding Flashlights

Behind them a giant bull of Plate II guards the entrance of a cave. When the giant [illegible] discovers the secret [illegible] they [illegible] their schoolmates of the amazing display of primitive art. M. Louis Laval [illegible] at burner is keen though they were [illegible]

Painted on the wall near the inner end of the gallery is a stampede of wild horses. One steed, his free threshing the air [illegible] falls backward off a cliff or [illegible]

The unknown artists knew their models at first hand and portrayed them so skillfully that there is no [illegible] their subjects. In one long frieze five stages follow one another with lifted heads and outstretched necks. Although only the heads are pictured, there can be little doubt that the animals were racing at a gallop or swimming as [illegible]

Lascaux figures painted in red and black [illegible] incredible freshness and vigor to describe their prehistoric age.

A Fallen Chip Mars This Bull's Head, Portrayed with Brush, Fingers, or Primitive Air Gun of Hollow Bone

Perhaps the stone splintered before Christ was born such drawings come from a time before man became farmers. Meat was their main diet, and various forms of magic were used. It is probable that such prehistoric art was not for art's sake, but to [illegible] through sorcery, divination, or augury.

◄ This Arrow-marked Stallion Has Been Chasing His Mate (Left) for 15,000 Years

Nobody knows by what light the cave men depicted the wild animals that flourished in their day. By torch, bonfire, or dry moss floating in fat? No smoke can be smudge the walls of Lascaux Cave.

▼ Such Overlaid Drawings Cause Much Controversy among Savants

Is a pregnant cow a prayer for results? Are her crooked legs a heritage from an earlier deer painting? Such questions are still unanswered, for the cave men superb artists, could not write.

hunted—if one may so describe it—with the desire to test the glacial waters and water-logged siphons of Montespan.

However, on the day agreed upon, only Henri Godin, the most cavernous of all for subterranean adventure, could join me.

When we emerged from the cave with our teeth chattering from the cold, we were thrilled as well as chilled. We had just found clay statues of lions and a headless bear, similar to the famous clay lions of the cave of Tuc d'Audoubert (page 776).

Within a month, with pick and shovel, my friends and I had so lowered the level of the stream that eminent scholars were able to wade up what had been a water-clogged siphon.

Because of their passion for learning, these distinguished prehistorians were not stopped by the cold subterranean stream. They found these modelings of lions and bear still recognizable, although experts, granting them an antiquity of 20,000 years or more, called them "the oldest statues in the world."

Tramcy Hits the Jack Pot

The Cave of Thieves (*Baume—Cave; Larrone* or *Ladrone*—Thief) is not far from that showpiece of Roman architecture, the Pont du Gard.

Known for centuries as a haunt of brigands and a hide-out for Protestants during the War of the Camisards, the cave was already familiar to archeologists.

In April, 1940, some high school students of Nîmes cycled along the banks of the Gard, looking for likely caverns to explore. Entering La Baume Ladrone, Suter, Roque, and Martin followed it back for 300 feet. At its inner end they felt a draft blowing through a tiny hole in the terminal wall.

With his bare hands Suter went to work to remove the clay cork which closed this neckbreak.

Roque and Martin tried to talk him out of it.

"Come on, don't be foolish! It is getting late. We'll come back later."

Outvoted, Suter had to agree. But two weeks later they all returned with picks and shovels. They were cramped by the tight walls. The work was hard. But they had become willing slaves of the demon of adventure.

Suddenly there was no more clay in front of them. Nothing! They stretched their hands through into dark emptiness. Silently, but for the beating of their hearts, they entered a high, chilly hall, like an underground cathedral.

Suter's foresight had paid off. On the rock walls they made out the crude paintings of elephants, rhinoceroses, stags, and bisons as well as of some strange reptile ten feet long.

This cavern of Gard added a bright chapter to the dusty archives of prehistoric art discovered by youngsters.

A Fox Hunt Wins Fame

Some of the great discoveries of young explorers were the result of mere chance. The heroes of Lascaux, accessories before the fact, deliberately sought out the underworld even if it was only as the haunt of fox or badger.

How amazed the young scamps would have been if, on that morning of September 12, 1940, when they took their dog Robot into the domains of the Countess Emmanuel de La Rochefoucauld, anyone had predicted the results of their poaching!

As in *The Three Musketeers*, they were four: Marcel Ravidat, 17; Georges Agnel, 18; Jacques Marsal, 15—and Montignac kid [illegible] and Simon Coencas, a 15-year-old [illegible] Paris.

Arrived at the top of a hill a mile or so from Montignac and not far from the old manor of Lascaux, the young men wandered amid the stones and juniper thickets. While sniffing around, Robot fell into a hole hidden in bushes.

Loudly the young fellows called their dog. There was no answering bark. Then Ravidat, the oldest, spread aside the brambles and discovered a sort of natural well into which he cautiously descended.

Arrived below, with no other light than a box of matches, he found his dog. A tempting corridor lay ahead, but his matches were gone.

Next day, provided with a rope, candles, and an oil lantern, the four boys set to work.

Yesterday's young fox hunters, now transformed into speleologists (the Greek word for cave lovers)—edged along a ridge of fallen earth, scrambled between the piled-up floor and the rock roof, and at about 50 feet below ground level entered the first hall.

There, by the feeble beams of their sputtering light, they suddenly made out on the whitish walls the most extraordinary array of prehistoric paintings and drawings that modern man has ever seen up to now.

An immense cavalcade of fantastic animals, a veritable menagerie of long-forgotten epochs, stretched out before the astonished eyes of the young men. Everywhere, lifelike outlines stood out from the walls, and the boys moved in a hazy atmosphere of dream paintings fixed on rugged rock. All excited, they

During the Chill Winter, the Baudry Family Hugs the Fire

[illegible]
In the Baudry kitchen at Montignac the girls feasted on food Paris could not [illegible]

[illegible]

With the skepticism of a veteran scholar [illegible] they were pulling his leg. [illegible] the scientist [illegible] them into the treasure [illegible]

A [illegible] boy, when he crawled out, [illegible] was infuriated by the [illegible] French [illegible] to a point [illegible] underground [illegible] had found the zenith of all [illegible] art.

[illegible] discovery [illegible]—the cave of Lascaux [illegible] not lost. Do not these living adventures, which I have checked, surpass the derring-do of fictional heroes? Where in the annals of science has [illegible]

Love of Caverns Unites Two Old Friends

The grotto of Lascaux—by far the most [illegible] preserved gallery of [illegible] art—was [illegible] by a reporter for the NATIONAL GEOGRAPHIC MAGAZINE.

After more than 50 years of globe-trotting for the NATIONAL GEOGRAPHIC MAGAZINE to scenes of geographic, historic, and artistic interest the world over, my old friend, May-

Madame Baudry, Friend of Cave Explorers, Makes Pots of Her Hens

Centuries before man felt the need of a literature, he had the impulse to paint caverns walls. The Vezère region, [illegible] with countless [illegible] prehistoric art [illegible] Madame Baudry's farm gives access to [illegible] the most recently discovered.

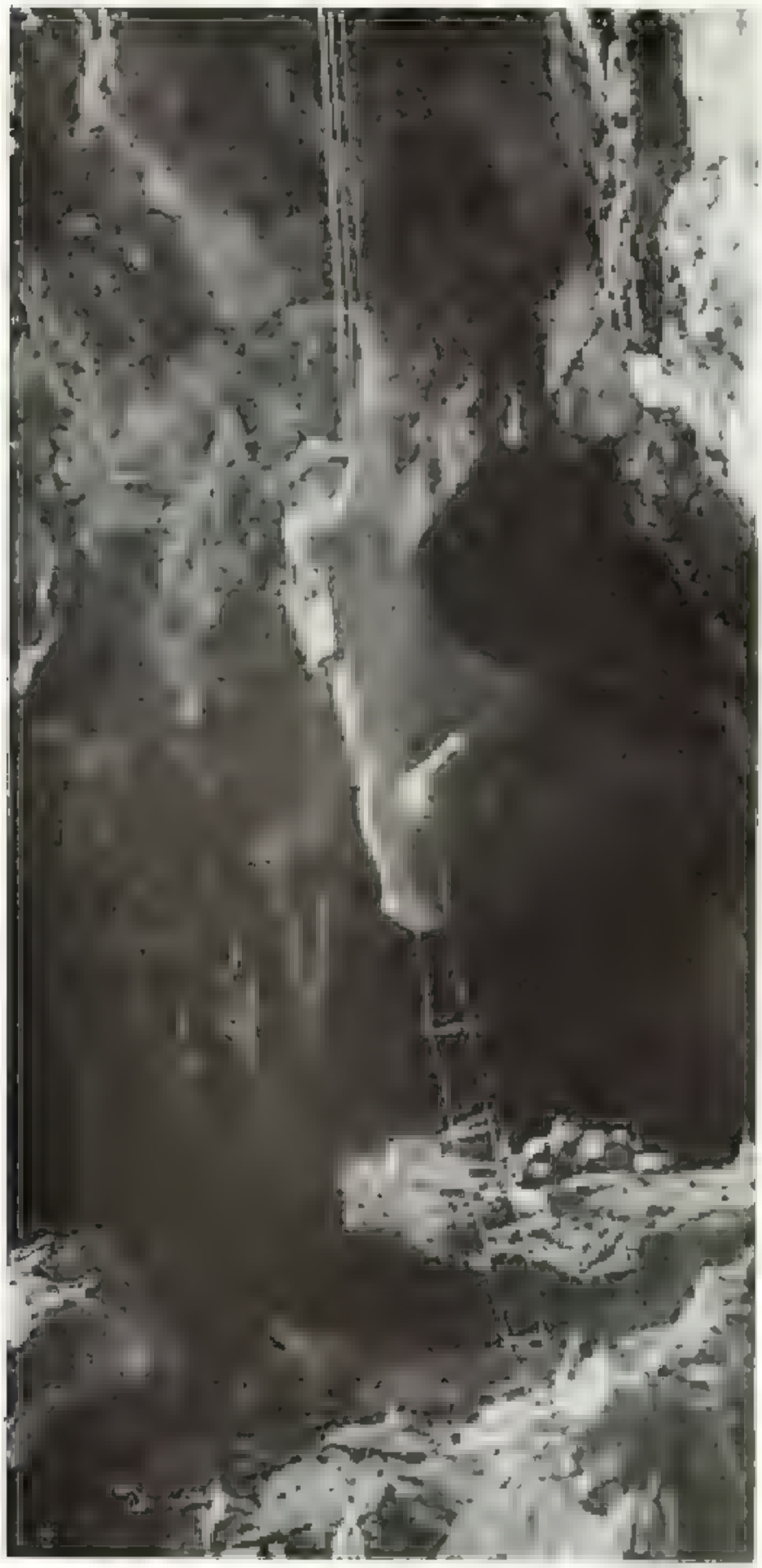
and Owen Williams, invaded my own chosen field and hustled me off to the choicest prehistoric prize of all. Overflowing with energy and avid for information, he [illegible]

[illegible] before last after I ha[illegible] [illegible] time to Toulouse where I [illegible] student, [illegible] had to [illegible] cavern into which I [illegible]

[illegible] know whether NATIONAL GEOGRAPHIC readers then realized the profe[illegible] drive and personal curiosity which [illegible] mid February to strip to the [illegible] plunge into the glacial waters of M[illegible] I waded ahead in water up to my chin, [illegible] ing high a lantern. He followed me, brandishing a tall tripod with its camera, and hitched along packets of flash powder under the cave drip that tingled on our necks.

Since that adventure deep in the earth, I had read that Williams had crossed the snow roof of the world as a member of the famous [illegible]-Harris expedition across Asia from Beirut to Peiping.

[illegible]



Down a Cobweb Ladder the Author Descends into a Pyrenean Underworld

[illegible] Henri Mort [illegible] (Dead Woman) [illegible] [illegible] [illegible] Thousands [illegible]

For years I had had no news of my persistent partner in subterranean aquatics. But in January 1948, coming from a lecture I had just given in the Salle Pleyel in Paris, I had a pleasant surprise. My friend [illegible] with outstretched hand, wearing the same boyish smile I had [illegible] 23 years before.

Right off he told me, as if we had been separated only for a week or so, [illegible] that Dr. [illegible] was interested in [illegible] and suggested that I [illegible] to study and photograph the Lascaux murals, about 370 miles south of Paris.

He knew [illegible] and I had long [illegible] to visit this [illegible] prehistoric art. We were soon on our way.

When we stopped in front of the village school, the pupils were [illegible] their recess [illegible] playing [illegible] the [illegible] car bearing the name of the National Geographic Society.

[illegible] situation when we met the [illegible] M. Léon Laval, the friendly and generous [illegible] of Lascaux [illegible]

My life work has been the exploring of grottoes. Lowering [illegible] ladders into the [illegible] of subterranean waterfalls [illegible] in August 1923 [illegible] Henri Morte [illegible] (Dead Woman) [illegible] footprints [illegible] and [illegible] 15,000 years [illegible] —[illegible] life.

My lectures have been attended by thousands of young people eager for adventure [illegible] others [illegible] a better knowledge. My books have been translated into many languages.

M. Laval was much impressed [illegible] standing [illegible] subterranean [illegible]

Axon Bone of a Cave Bear Gives the Cistercers Food for Thought

[illegible]

[illegible]

Vacuum Aid in Photography

[illegible]

Is This Rhinoceros Wearing a Woolly Arctic Coat or a Tropical Sun Tan?

It would be hard to be tropical France during a glacial epoch, perhaps [illegible] years ago. If not, he was drawn [illegible] a warmer climate moved across [illegible] His two horns and tangular shape identify him

[illegible] Commission, [illegible] case among the most [illegible] national monuments of France, immediately [illegible] what was essential to protect the [illegible] treasures.

Some more may enter without the Conservator's permission, neither uninstructed [illegible] age nor willful vandalism is to be feared. The [illegible] essentials—an entrance pavilion, a [illegible] stairways, and a motor road to the [illegible] entrance—may come later.

In the Underground Sanctuary

A dull sound echoed through the [illegible] cavern corridors as the heavy door swung [illegible] behind us. We were [illegible] modern life. [illegible] felt [illegible] from the world's [illegible] from the tyranny of time, we [illegible] crowding up of the mighty [illegible] millenniums here unmarked [illegible] sun and stars, had faded away [illegible] Stone Age ancestors decorated these [illegible] walls!

Our guide, a jovial companion, suddenly became serious.

In the sunlight he had overflowed with comical quips. Now in the dark he gave us another introduction to the prehistoric masterpiece.

Silently he directed the beam of his lamp toward the wall. We gradually saw the outlines of a gigantic bull traced in black on the tawny rock. One could not miss the impressive force and realism of this sculpture.

It is the largest drawing of all [illegible] cicerone. Thus, under his breath, [illegible] willing to measure such an aristocrat in mere figures. "It is 18 feet long" (Plate VII).

We were amazed at the fidelity and fine proportions of this giant bovine, traced by what [illegible] and with the aid of what light? On a [illegible] cracked, rugged, and scaly wall.

Soon, even in dark corners remote from our

His Entrails Hanging, a Wounded Bison Charges the Hunter

[illegible] like a bru[illegible] Fernand Windels on [illegible] demanding exposures ranging from [illegible]

[illegible] painted in red and black [illegible] after incredible fre[illegible] complete [illegible] pro[illegible]

Since these are [illegible] Magdalenian figures, the [illegible] they date back [illegible] 10,000 years—[illegible] of recorded history.

True, these paintings had [illegible] with [illegible] natural colors [illegible] and [illegible] of manganese. And [illegible] sealed up by a cave-in [illegible] destructive elements.

In a Prehistoric "Zoo"

[illegible] on the surface [illegible] and chipped off the color [illegible] fog or sunlight faded its tones. [illegible] prehistoric frescoes have been preserved better than in any other cave yet known.

We saw a white [illegible] horses like Shetland ponies, a herd of [illegible]

[illegible] painted in [illegible] positions. On the ceiling, figures

To Reach the Painting of a Wounded Bison, Explorers Use This "Parrot Ladder"

The rhinoceros and the bison [illegible] the hunter pictures (pages 790 and 791) were found at the bottom of the [illegible] wall. [illegible] few visitors [illegible] allowed to enter the narrow [illegible] grottoes [illegible]

deer, a big-horned stag of the tundra, a big black bull reaching out his muzzle toward a tuft of grass (Plate III).

Near the inner end of the gallery is a stampede of horses, one of which falls over backwards off a cliff or into a trap.

The unknown artist knew his models at first hand and portrayed them so [illegible] that there is no mistaking his subjects. In [illegible] with uplifted heads and outstretched necks. Although only the heads are pictured, there can be little doubt that the animals are fording a stream or swimming a lake.

Not far from this unseen scene, a red horse and a black bison are pierced in vital spots with seven arrows. Two great jet black bison gallop away in opposite directions. Who can doubt that some prehistoric Frederic Remington was reproducing a scene familiar to his eyes but still a mystery to us?

These 400 animal portraits, some half hidden by later figures, are so superimposed and tangled that they form a highly complicated puzzle. Whether the original artist corrected some faulty lines or a subsequent critic criticized his efforts, who can say?

Even photographs cannot do full credit to the lifelike postures and proportions of the figures.

While we could move at ease [illegible], being careful not to stumble as we proceeded from

Prehistoric Stags Are Pictured with Thick Horns, Thin Legs

[illegible] cattle and deer. But in [illegible] lost in the black muzzle [illegible]

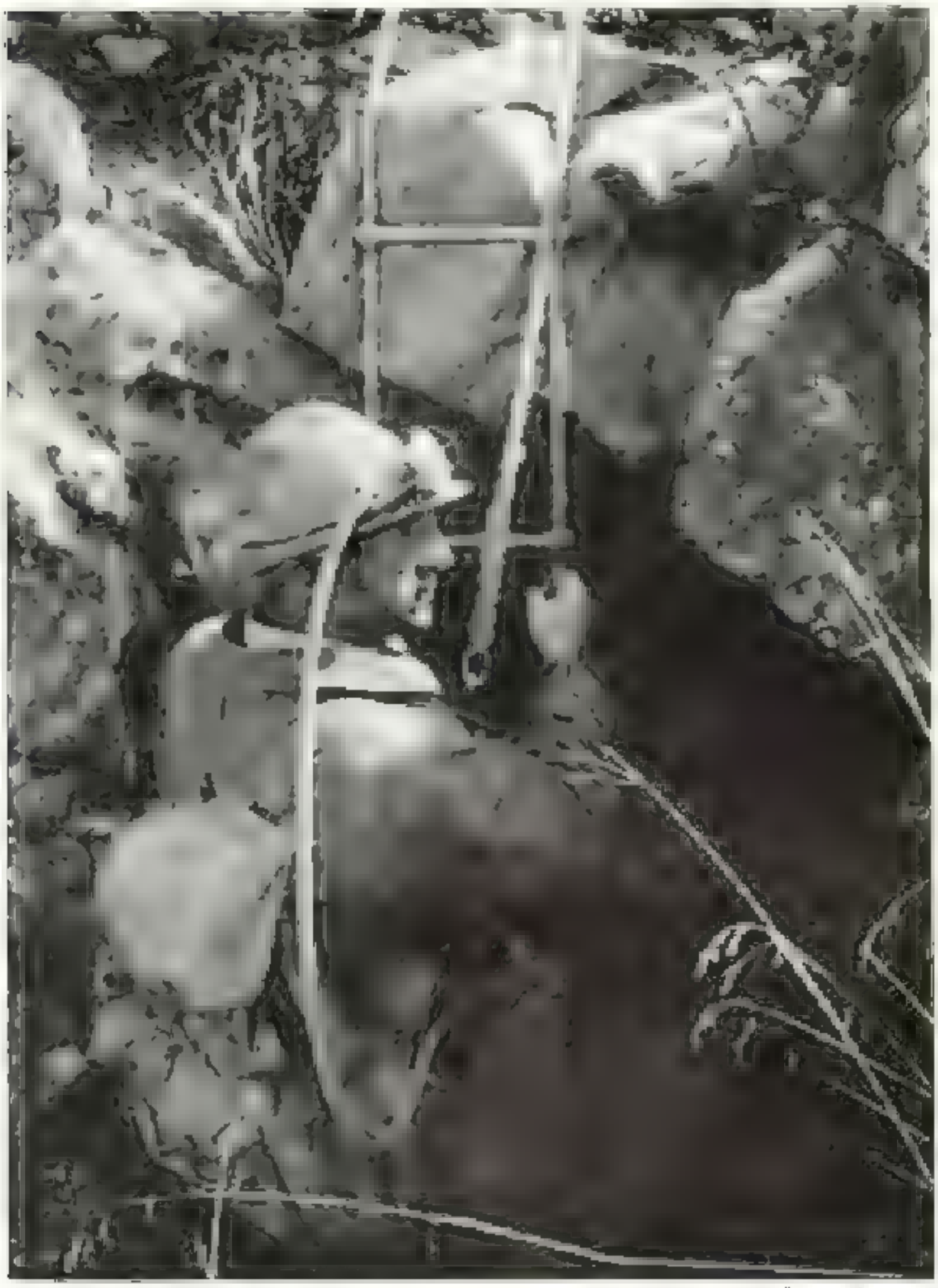
[illegible] hitch to [illegible] of [illegible] history [illegible] our photographer was having a [illegible] and setting up his flares. I used [illegible] the stress and adjusted [illegible]

An absence of [illegible] has been a major factor in preserving these ancient art. But during our visit the grotto was more [illegible] than it may have been for years of thousands of years. It took two hours of [illegible] our photographer to warm the [illegible] so that they would not [illegible] completely.

Now standing on [illegible] and leaning back at a crazy angle [illegible] and [illegible] up at the [illegible] our photographer [illegible] the [illegible] and [illegible] which may seem [illegible] good [illegible] but which tomorrow [illegible] to a [illegible] in the [illegible]

Most [illegible] are [illegible] but underground [illegible] is [illegible] in the dark, and has to [illegible] and [illegible] on flashlights.

[illegible] Mother Earth [illegible] a place in which [illegible] for [illegible] should [illegible] at Montignac [illegible] the grand [illegible] [illegible] and [illegible] two steep



Casteret Enters One of His Thousand Caves

[illegible] remarkable hunting [illegible] of all.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] and had the talent t[illegible] brutal scene—a [illegible] man's early struggles for food or safety.

[illegible]

Sinai Sheds New Light on the Bible

By Henry Field

*Physical Anthropologist, University of California African Expedition**

Photographs by William B. and Gladys Tietz, Fred Jones, Photographers

"Sahlan, keep the wheels turning. Never mind which track you follow."

So said our desert guide, one-eyed, one-armed Sehman, known to every Bedouin in Sinai. For all his physical infirmities—he was injured while dynamiting sharks in the Red Sea—he knew every inch of Sinai's rock and sand.

We were approaching St. Catherine's Monastery on Christmas night. The date was January 12, 1947, for its Greek Orthodox monks still followed the Julian calendar.

First we crept through deep sand, then over rough cobblestones which paved hairpin bends on low but steep hills. Then, towering above us against the stars, we could see the ramparts watched over by the monks for 1,400 years.

Mount of the Ten Commandments

The two trucks stood nose to nose against the dark, shadowy wall. Their panting and gear-grinding over for the day, they seemed glad to have reached this religious haven at the foot of Mount Sinai. They could not have been parked very far from the spot where the children of Israel awaited the return of Moses with the tablets of stone bearing the Ten Commandments.†

A huge wooden gate swung open near by. A dozen figures streamed toward us. In the center, their beards silhouetted by the swinging lanterns, stroked two monks. Suddenly we were confronted by a language difficulty, for none of us spoke Greek. Then out of the night came these reassuring words:

> "That's O.K. right there. Welcome all to St. Catherine's. Merry Christmas!"

Father Nile, master of five languages, greeted us (page 809). We echoed his cheerful salutations.

Unloading the trucks began. Many willing hands, guided by Arabic words, assisted us. Our helpers were Jebelieyeh (Men of the Mountains), hereditary servants of the monastery. We were led through the gate, across paved courtyards, and up stone staircases to a wooden balcony off which opened guest rooms.

The night was cold and clear, for St. Catherine's stands 5,000 feet above the level of the Red Sea. Father Nile, who was to be our guide and companion for the next five days, served us a hot meal before retiring. (Incidentally, he is named for St. Nilus, not for the River Nile.)

"Where the Sun Rises in the West"

About 200 airline miles from Cairo and Jerusalem, this isolated monastery is in the south-central part of the Sinai Peninsula, which forms the land bridge between Africa and Asia (page 797 and map, page 799).

As we stood on the cold balcony early the next morning Father Nile commented that this was one of the few places in the world "where the sun rises in the west." Indeed this did seem to be true. St. Catherine's nestles against the shady northern flank of 7,497-foot Gebel Musa, the traditional Mount Sinai, which blocks the early-morning rays. They are reflected onto the monastery from a rocky flank on the west.

During breakfast we explained to Father Nile that we were the Sinai phase of the University of California African Expedition.

Wendell Phillips, 26-year-old leader of this expedition, described how on lonely watches during his five years in the merchant marine he had dreamed of hunting for fossil man and apes in Africa. We were part of that dream come true. Scientific research was then in progress in Sinai, in the Faiyum of Egypt, in South Africa near Johannesburg, and in the great Kalahari Desert.

The dream of a Cairo-Capetown expedition with a fleet of 22 automobiles, an airplane, and a motorboat was becoming a reality.

Every branch of natural history was represented in some phase of the work. There were searchers for primate remains and cultural traces of ancient man, recorders of measurements and observations on the modern peoples, fossil hunters, collectors of animals and plants, researchers in tropical medicine, and several photographers.

* Dr. Field was Curator of Physical Anthropology, Field Museum of Natural History, Chicago (now Chicago Natural History Museum), until he entered United States Government service in 1941 to do research on the Near East. He has led or participated in nine archeological expeditions to Europe, Africa, and southwestern Asia.

† See "East of Suez to the Mount of the Decalogue," by Maynard Owen Williams, NATIONAL GEOGRAPHIC MAGAZINE, December, 1947.

Little Did the Donor Think that Scientists Would Study His Skull

[illegible] with his calipers [illegible] of 19 skulls from an old "bedouin" tomb in Sinai's Wadi Sala. Wendell Phillips, a veteran old leader [illegible] the [illegible] each skull [illegible] the anthropologist [illegible] as [illegible] and is now (page 811)

Wendell, looking around the table at the Sinai group, described our various duties.

Prof. William F. Albright, of Johns Hopkins University, a specialist in ancient languages and biblical archeology, was on the trail of early historical records linking Palestine and Trans-Jordan with the Nile Valley. He was studying ancient Egyptian cultures and was [illegible] to the proto-Sinaitic inscriptions [illegible] Shadin, the oldest writing in our area [illegible] whose experience and profound knowledge were throwing new light on certain Biblical problems.

My jobs were to measure and describe in detail every Bedouin willing to submit to [illegible] pets, compile all available tribal [illegible] search for [illegible] who might wander in Sinai.

With us were William B. Terry, field executive and photographer; his wife, Gladys, business manager, photographer, and pilot; and Walter Thompson, technical assistant and handy man.

Down below, guarding the trucks, were Selman; Sabit Gaizarak, a Jebeli guide; and our three Gurfis, [illegible] Mahmud el-Far, and Maghrabi (pages 806 and 813).

Skilled Gurfis Proud of Reputation

Gurfis are trained excavators from Gift near Luxor. They are direct descendants of men trained in excavation methods and technique by the distinguished Sir W. M. Flinders Petrie, "father of archeology," and later by Dr. George A. Reisner, of the Boston Museum of Fine Arts, and others.

The Gurfis are proud of their [illegible] knowledge. Throughout Egypt, the Sinai, Palestine, Syria, and the Trans-Jordan, they are respected by all.

These men are practical aids [illegible] well, for they can cook, keep house for scientists in the

To the Desert-seven Expedition Lies Monastery Offered Warm Welcome in Lonely

"Now the Glory of the Lord Abode upon Mount Sinai"

[illegible]

[illegible] Museum.

[illegible] for example, if a [illegible] small change should be made in [illegible] belongings, this would be a serious reflection upon their veracity.

At the monastery our hosts showed keen interest in the results of our expedition thus far.

We had found a [illegible] Stone Age sites on the [illegible] between Africa and Asia [illegible] that ancient man had [illegible]

[illegible]

[illegible]

[illegible]

[illegible] harmless [illegible] [illegible] 22 [illegible] [illegible] [illegible]

Stone Tools 100,000 Years Old!

In answer to questions we related how we had [illegible] the desert surface [illegible] tools which proved the existence of ancient man in the northern area beyond the Suez Canal and almost as far eastward as the Palestine border.

The most important site was at El Kab [illegible] southeast of [illegible] low hill, overlooking [illegible] water [illegible] A superb series of hand axes was collected from an [illegible]

Tentatively estimated to be 100,000 years old, these flaked stone tools form one of the most important series in southwestern Asia. They belong to the pre-Neanderthal [illegible] known as Acheulec-Levalloisian, [illegible] from the localities in

Here Scientists Sought Ancient Secrets of Sinai, Land Bridge Between Africa and Asia

[illegible] Under Sinai's Arid [illegible] Between Suez [illegible] The map [illegible] Mount Sinai [illegible] Red Sea not the Red Sea figure [illegible] The inset enlarges the area around Mount Sinai

On the Sinai Shore of the Gulf of Suez the Expedition Discovered the Site of an Ancient Egyptian Trading-station and Port.

Trucks of the University of California Expedition Crossing Wilderness of Tibet, One of the Most Desolate Places on Earth.

[illegible]

northern France where specimens of this technique were first found.

Even the Governor of Sinai, whom we encountered later, showed real surprise at our dating of these finds. He had no idea that men of the Old Stone Age had crossed northern Sinai, leaving evidence behind them.

To our friends at the monastery we described our journey from El 'Arish to Bir Hasana and on to Nekhl, the ancient capital, which now is a partially abandoned oasis standing astride the crossroads of Sinai.

Near this trans-desert track we had found occasional traces left by the Stone Age hunters in the Wilderness of Tih, probably the Wilderness of Zin where "the children of Israel murmured against Moses and Aaron in the wilderness . . ." (Exodus 16:2).

We were moved by the loneliness of this wilderness—scarcely any living plant or animal in all this vast expanse of sand (page 801). We could understand why the discouraged children of Israel cried out: "Wherefore is this that thou hast brought us up out of Egypt, to kill us and our children and our cattle with thirst?" (Exodus 17:3.)

Hour after hour we had driven across this deserted region, when suddenly the horror of its utter lifelessness was broken. A small gray-brown bird with bluish underwings flew from a barren rock and alighted on another boulder the better to watch our thunderous coming.

After driving for many, many hours across this lonely wilderness, we finally came out into civilization. In the distance were palm trees and buildings and the curious illusion caused by the superstructure of a large ship seemingly gliding through the sea of golden sand. This was the Suez Canal.

Ancient Egyptian Turquoise Port Found

Professor Albright also related to the monks how we had found the site of an ancient Egyptian settlement for which archeologists had been searching half a century.

It has long been known that Egyptian expeditions used to cross the Gulf of Suez, northwestern arm of the Red Sea, to mine in Sinai the turquoise with which the Pharaohs and their ladies were adorned. Archeologists reasoned that there must have been an ancient port on the Sinai side near the Serabit el Khadim turquoise mines, which lie 17 miles inland. All efforts to find the site had been in vain, however, until our expedition discovered it through a rare stroke of luck.

While we were encamped at Abu Zenima, on the Sinai shore of the Gulf of Suez, we told Salman to inquire of everyone, including a group of Bedouins, whether they knew of any sites where quantities of broken pottery lay upon the surface. To our surprise he returned shortly with word that an old bearded Bedouin knew of just such a place only about five miles farther along the seacoast, to the southeast.

Highly skeptical and certain that the pottery would turn out to be Turkish and relatively recent instead of the ancient remains that we sought, we nevertheless decided to have a look. The site proved to be a low mound on the edge of the Merkhah Plain, about a hundred yards from the Gulf (p. 800).

Pottery uncovered by wind erosion lay scattered over the ground, and to see the mound in cross section we did not even have to dig; the Sinai Mining Company had cut a trench through it for the tracks of a light railway connecting its Umm Bogma manganese mine with the sea.

"Heavens!" exclaimed Professor Albright after careful examination of the mound and the fragments of crude dark pottery. "This is too size that Petrie and the others have been looking for all these years!"

The pottery, he found, was unmistakably ancient Egyptian, of about 1500 B.C. Furthermore, this was the logical site for the ancient settlement, because it lay on a protected cove at the nearest possible point to the turquoise mines.

Theory Substitutes Reed Sea for Red

However, the real significance of this discovery lies in another direction. A trial trench in the part of the mound nearest to the sea showed that since 1500 B.C. its waters had not reached even to the base of the mound, which is six feet above the present Red Sea level. Thus the Red Sea has not risen appreciably during the past 3,450 years. This confirmed evidence obtained by Dr. Nelson Glueck in excavating Solomon's seaport at Ezion-geber near 'Aqaba in 1937-40.*

These findings shed important light on the story of the Exodus, which took place considerably after 1500 B.C. The route by which Moses led his people out of Egypt is north of the present Red Sea (map, page 799). Scholars previously had explained Moses' crossing of the Red Sea by assuming that its level at the time of the Exodus was some 25 feet higher than at present and that it thus extended northward all the way to the Bitter Lakes.

The work of Dr. Glueck and our discoveries at Merkhah Port, combined with our visits to Raamses, Succoth, and Pithom—all mentioned in the book of Exodus—lead to the

* See "On the Trail of King Solomon's Mines," by Nelson Glueck, NATIONAL GEOGRAPHIC MAGAZINE, February, 1944.

Before the Glorious, Glowing Altar a Monastery Priest Upholds the Cross

[illegible]

[illegible] Moses and his [illegible] were being pursued by Pharaoh's [illegible] and [illegible] However, Moses [illegible] the [illegible] the Red Sea, the [illegible] Egyptian [illegible] of water [illegible]

According to Exodus, the Israelites followed the Pillar of Cloud and Fire [illegible] the Red Sea. [illegible] the Egyptians [illegible] the Israelites [illegible] the Red Sea. [illegible] the Israelites [illegible] the Red Sea [illegible] the Egyptians [illegible] the Red Sea [illegible]

In January, Professor Albright [illegible] the Red Sea [illegible] was [illegible] a part of the Red Sea. This is [illegible] and a typographical error [illegible] the Red.

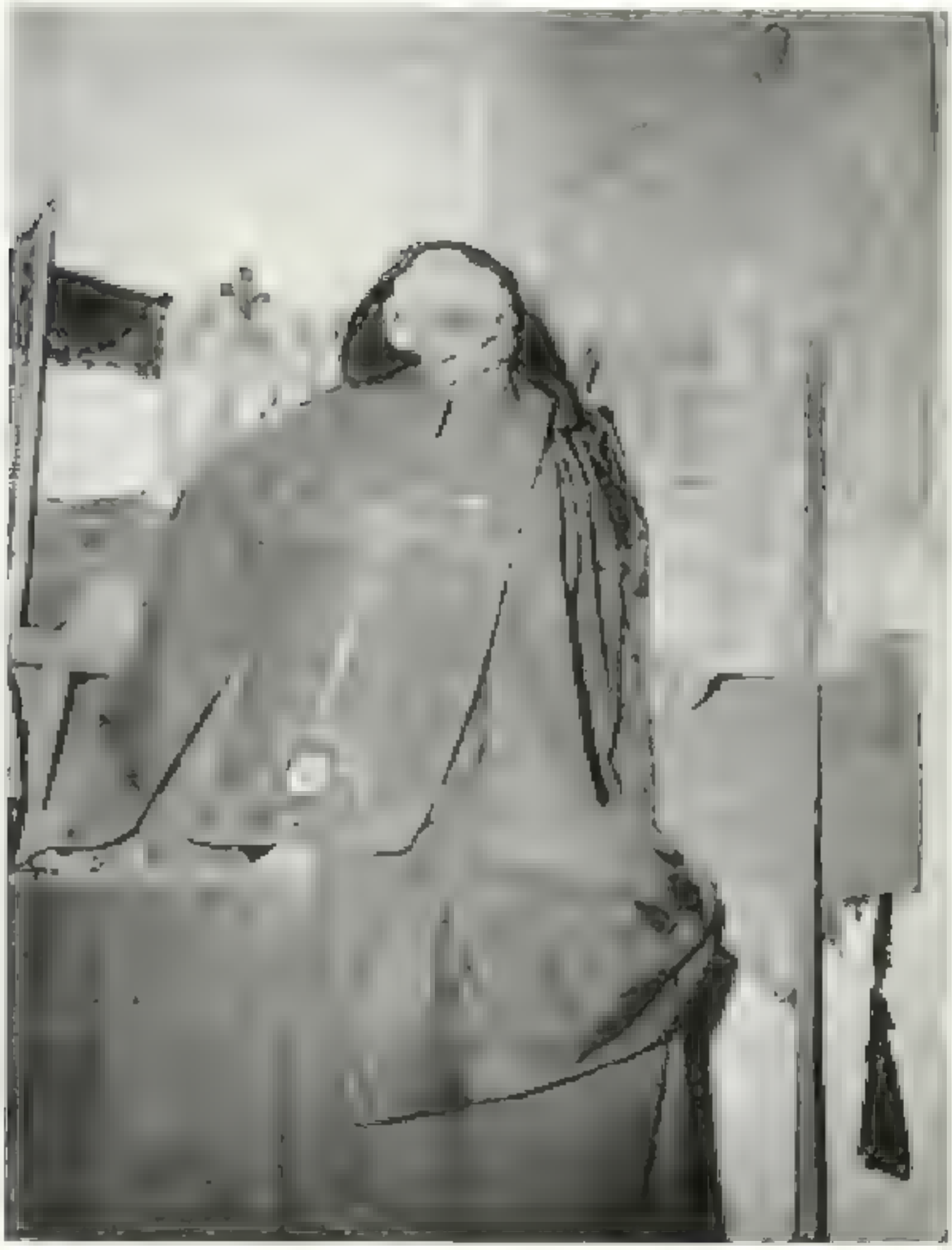
[illegible] St. Catherine's we last brought mail, their first in two months; newspapers in Greek and Arabic [illegible] warm weather [illegible] U. S. Army Air Force [illegible] from War Surplus [illegible]

Monks Prize Air Force Boots

Father Nicholas [illegible] Two [illegible] 4 [illegible] the [illegible] of the [illegible]

[illegible] Superior and his [illegible] who entertained us [illegible] Father Nicholas [illegible] as interpreter.

The Superior welcomed us heartily, offered



"St." Stephanos, Dead 1,368 Years, Still Serves as Watchman

[illegible] church vestments and stationed at [illegible] the threshold of [illegible] Here the [illegible] continue keeps watch.

saved . . . And (the Lord) said, Draw not nigh hither: put off thy shoes from off thy feet, for the place whereon thou standest is holy ground." (Exodus 3: 2, 5-6).

Story of St. Catherine

The name of St. Catherine appears to have been adopted during the eighth or ninth century. One legend is that this Christian girl defied the Emperor Maximinus II, converted the Empress who visited her in prison, and was finally about to be broken on the wheel when it was miraculously broken itself.

She was beheaded at Alexandria, but in answer to her prayer angels transported her body to Mount Sinai [illegible] Christians [illegible] it several centuries later. Afterwards, the monks brought it to the monastery, where it has been venerated ever since.

Upon occasion two small silver boxes are opened [illegible] her skull and the other [illegible]

us hospitality for as long as we might wish to stay, and extended the rare privilege of working in the monastery's world-famous library. From our host we learned the early history of the monastery, in an account similar to that which A. Mary K. Dobson, Paul Gotch, and others have quote.

According to tradition, Queen Helena, mother of the Emperor Constantine, visited Sinai in 342, and a church was built on the site of the Burning Bush from which the angel of the Lord spoke to Moses.

And the angel of the Lord appeared unto him in a flame of fire out of the midst of a bush: and he looked, and, behold, the bush burned with fire, and the bush was not con-

Walking around the battlements of the monastery, we passed 16th-century cannon, relics of former battles for the privilege of sanctity and escape from the troubles of the world.

[illegible] ingenuous in its very futility. Below us is a wooden structure housed the windlass which hoisted the early travelers in and out of the monastery. [illegible] is now used to lower supplies and the daily ration of bread to the Jebeliyeh: three hard loaves for each man, two for his wife, and one for each child. Every loaf has to be soaked in water before it can be eaten.

We walked down some stone steps, through narrow passages, some underground, past

whitewashed walls to be Byzantine built [illegible] 565 and dedicated to the safety of our pious Emperor Justinian (A.D. 483-565).

Through a huge carved door we passed into the rich Byzantine interior of the Church of the Transfiguration, later renamed for St. Catherine, with its 12 gilded columns and elaborate candelabra. On the door lintel was engraved in Greek: "On this spot the Lord said unto Moses: 'I am the God of your fathers, the God of Isaac, and the God of Jacob. I am He who [illegible]' This is the [illegible] of the Lord [illegible] through it [illegible]." We then escorted us to the Chapel of St. John. Here we [illegible] our shoes, for the place we were to enter was holy ground. Through a narrow doorway, we moved in single file to stand silently before the site of the Burning Bush. Here we were following in Moses' footsteps.

Outside we passed an acacia tree growing from the wall at the back of the church. One of the monks gave each of us some leaves from this sacred tree, which, according to tradition, sprang from Aaron's rod. I pressed [illegible] daughter Miriam's Bible: "And Moses went into the tabernacle of witness, and, behold, the rod of Aaron for the house of Levi was budded . . . And the [illegible] said unto Moses: 'Bring Aaron's rod again before the testimony, to be kept for a token against the rebels . . .'" (Numbers 17: 8, 10).

At this Christian monastery we were [illegible] by order of Abu Ali Mansur Anachtakin el-Amri from A.D. 1101. On account of the Bedouins of Sinai, and [illegible] worship. Jacob of Verona, a monk, about the year 1335, observed how Saracen [illegible] minaret, since at that time St. Catherine's Monastery was under the Sultan's domination.

Ancient Egyptians Cleft This Rock of Ages for Turquoise

Today, to obtain the bluish-green gems from the Wadi Maghara, Bedouins blast with dynamite. With [illegible] Quilici, [illegible] Dr. Fritz searches for [illegible]

From a Priceless Book Reaches Moses

We [illegible] hall of the monks. In a high vaulted room [illegible] 50 feet long, stood two wooden tables [illegible] wooden benches before each seat.

[illegible] passages and stairs to the library. This was the original home of the *Codex Sinaiticus*, a Greek manuscript of the Bible and one of the

most famous books in the world. It was sold to the British Museum in 1933 by the Soviet Government for nearly $500,000.

How this Codex reached Moscow is an interesting story, told in two versions. L. F. K. von Tischendorf, a German Biblical scholar, visited St. Catherine's in 1844 and was granted permission by the monks to look through their library. According to his version, Tischendorf found a section of the New Testament about to be burned as rubbish. At his request it was given to him.

Nine years later he returned to try to recover the rest of the manuscript, but without success. On a third visit, in 1859, a monk who had kept it in his cell gave it to him, wrapped in a red cloth. Tischendorf presented it to the Tsar, who sent a beautifully bound photographic copy as a present to the monastery. Seventy-four years later the Soviets, requiring foreign currency, sold the original to the British Museum.

In the opinion of various scholars, Tischendorf acted correctly throughout the entire transaction. He later obtained decorations and a gift of 9,000 rubles for the monastery. Moreover, he stayed on good terms with it during his lifetime.

The version which we were told by the librarian of St. Catherine's was that Tischendorf begged permission to take the *Codex Sinaiticus* to Cairo in order to copy it and that he never brought it back.

Its loss, no matter how it happened, is still a sore subject at St. Catherine's.

The librarian also told us of an Arabic psalter in which a monk had written the story of the two sons of a rich merchant. One gave away his inheritance and became a hermit; the other kept his wealth to help the needy. Which was the greater saint? The recorder ended further argument with the words: "In Paradise I saw both."

The librarian generously showed us a few treasures. The *Codex Syrsin* of the Gospels, dating from the fourth or fifth century after Christ, and several illuminated manuscripts including Cosmas Indicopleustes' *Christian Topography*, which dates from about the 12th century. There are texts in Greek, Arabic, Syriac, Slavonic, Persian, Georgian, and Ethiopic. Here is indeed a world's treasure house.

Poor Painter Unaware of World Wars

As we walked along the balustrade toward the great rooms, we saw below a monk painting icons. Father Nile showed us examples of his work and told us that the artist had been in the monastery continuously for the last 56 years. He is fond, very fond, of cats. Each monk receives a daily food ration. The artist shares his meager meals with his many cats, some of which follow him around wherever he goes.

He neither knows nor cares about the outside world. A few years ago a visitor engaged him in Greek. The artist was mildly surprised to hear about World War II, but not half so surprised as the visitor, who discovered the monk had not even heard of World War I.

In direct contrast is Father Nile, who has been in the monastery only since July, 1947. During the last war he was a censor for the Egyptian Government. His knowledge of five languages made him exceptionally useful—as well as his ability to read printing upside down almost as easily as right side up.

Father Nile has a radio, so that he can keep the Superior informed of major world events. A jack-of-all-trades, he is electrician, carpenter, plumber, shoemaker, and general handyman, so that his nondevotional time is more than full.

Skeleton Guards Bones of Monks

Each morning at 4:15 we were awakened by one of the young novices beating with a wooden bar between two uprights the same haunting rhythm. At 4:25 he tolled the great bell for the call to prayer, which lasted until 9 o'clock. Chanting in Greek bathed the air.

Special services are held in the afternoon. Phillips and I attended a memorial to the stoning of St. Stephen, in the little chapel dedicated to this martyr. At the conclusion we were each given a round, flat loaf of bread [illegible] where the skull and bones of every monk are stored.

Inside the entrance and apparently still on guard sits "St." Stephanos, the porter, dressed in his robes of office. No watchman has stayed at his post longer than he, for in life he guarded the way up Gebel Musa (Mount Sinai) and since his death about the year 580 his robed skeleton has guarded the entrance to the charnel house (page 804).

Within, the skulls of the monks are arranged in one rather gruesome heap, long bones like

Remains of Long-dead Monks Still Hang in the "Bone Room" of the Monastery

[illegible]

[illegible] in another. The skeletons of the superiors are preserved separately in wooden cases. Bones of the few visitors who died there are kept apart.

Chain Links Brothers Even in Death

In one double case, still [illegible] in the remains of two brothers. [illegible] but another story relates [illegible] were two brothers from Provence, France, who had yielded to passion and murdered their [illegible]. As penance they were forced to visit three sacred places—Rome, Jerusalem [illegible] Sinai.

They were also obliged to chain themselves [illegible] both could not sleep at the same [illegible] In spite of this, for the rest of their days [illegible] climbing mountains [illegible]

During the early centuries of Christianity [illegible] Mount Sinai. Many [illegible] were [illegible] martyrs.

[illegible] Emperor [illegible]

[illegible] are sometimes referred to as "Subvan [illegible]." [illegible] Bones of the Monastery," a [illegible] I tried. It met with great ap[illegible] knowledge of it implied that I was [illegible] acquainted with their history.

Here was an interesting anthropological [illegible] Ibn Jebeliyeh had acquired many [illegible] but were of [illegible] had been [illegible] the true [illegible] Jebeliyeh.

Would [illegible] measurements and observations [illegible] from [illegible] people

Rocky Desolation Now, Where Stood the Christian City of Pharan

[illegible]

Hospitable Hosts to the Expedition Were Greek Orthodox Monks of St. Catherine's Monastery, at the Base of Mount Sinai

[illegible]

photographs show differences from the Bedouins of Sinai? Here was a chance to find out.

Setting up a table in the lower courtyard outside the main gate, I studied about 70 Jebeliyeh for comparison with 185 Bedouins I had examined. The former seem to be taller, lighter skinned, more straight nosed, smaller boned, and more oval-faced. Final statistical comparisons have not yet been completed at Harvard.

The children were photographed and also encouraged to collect all manner of small animals. The quickest method of collecting is to pay a small coin for each specimen, whether it be lizard, scorpion, or beetle. Fifty children can gather a representative collection in a few hours, and they love it. Amid wild screams and much giggling they rush up with offerings until bedlam reigns and a halt is called.

The Ascent of Mount Sinai

On our last afternoon we climbed the 3,500 steps to the top of Mount Sinai. Our first breather came at a little chapel built, according to Sir Frederick Henniker, who climbed this way more than a hundred years ago, to commemorate a miracle. He wrote:

"The monks were once driven from the convent by fleas and famine—they were proceeding up the mountain to pray, when they were met on this very spot by a supernatural figure—say St. Catherine; this good angel informed them that they would find their larders replenished, and that fleas should never exist there again."

Higher up we passed through a gate at which it was customary for the pilgrim to confess his sins. Our first real halt was made in the shade of a large cypress standing beside a spring (page 798). Near by is a chapel on the alleged spot where the ravens fed Elijah. "And it shall be, that thou shalt drink of the brook; and I have commanded the ravens to feed thee there" (I Kings 17: 4).

After nearly two hours of tedious but not difficult climbing thanks to steps cut by one of the monks, we arrived panting at the top of Mount Sinai. A sip of water and a stick of gum were the physical rewards doled out by Gladys and Bill Terry.

Atop a huge rock we feasted our eyes in every direction over this great mountain complex, of which we seemed to be sitting on the gigantic fulcrum. To the east beyond the mountains lay the placid gray waters of the Gulf of 'Aqaba. To the southeast was the point known as Ras Muhammad. To the northeast appeared vaguely the escarpment above 'Aqaba.

In the golden rays of the setting sun, which picked out the blues and reds of the strata below, we sat amid mountain peaks in a sea of abomination and desolation. We recalled that Moses spent forty days and nights here alone on Mount Sinai when the Lord gave him the "tables of stone, and a law, and commandments which I have written; that thou mayest teach them" (Exodus 24: 12).

We were moved, deeply moved, by the loneliness, the beauty, and our thoughts. Without speaking we made the descent to reach St. Catherine's just before the quickly riding veil of darkness overshadowed the valley.

Trucks Again Hit Desert Trails

The next morning we bade our hosts farewell and turned our backs on this haven of refuge from the atom-bomb-fearing outer world of struggle and strife.

A last look backward showed two white-bearded patriarchs silhouetted against the blue sky as they waved to us from the highest battlement. Peace and quiet would now prevail until the next visitors appeared across the sands.

We followed a 10-foot stone wall behind which towered superb poplars, vivid green against the dun-gray rocks. Some Bedouin children were tending their long-haired black goats. Beside the track stood a small stone arranged as a Moslem prayer place facing southeast. Here a devout Moslem had bowed his head toward Mecca.

Through a narrow mountain gorge twisted the desert track. From the brilliant sunshine into this shadowy was like entering the nether world. We drove down the twisting Wadi el Sheikh, stopping at likely places to search for Stone Age tools or broken pottery, but to no avail. Around one sharp bend we saw Gebel Serbal directly ahead, impressive as ever, his proud iron-gray head pointing skyward.

Measuring Skulls from a "Beehive" Tomb

Late in the afternoon we passed the juncture of the Wadi el Sheikh and the Wadi Solaf, a turn we had missed on our way to the monastery. However, a wrong turning sometimes has advantages, and this was no exception.

In the Wadi Solaf we visited two circular "beehive" tombs (*mawmis*) standing on the bank. The capstone of one was removed and the skulls were measured and photographed. Each skull was replaced and the capstone resealed. These data will throw light on the physical characteristics of the early inhabitants of this region (page 796).

Toward evening we were approaching Feiran Oasis, the halfway point to Abu Zenima

rest house, which was our base camp in southwestern Sinai. However, we met Sheikh Suleiman in the camp of the Sawarka tribe. He invited us to encamp near him in the Wadi Sawah [illegible]

Swinging himself into the Dodge [illegible] truck, he guided us up a rock-strewn, twisting narrow stream bed around a corner where pleasant and welcoming smoke arose behind four black goat's-hair tents. They were pitched on the lee side of the Wadi Sawah, as usual, in the best possible location.

We camped some 300 paces to the north [illegible] to be [illegible] to the vicious barking dogs and, incidentally, to avoid the normal swarm of fleas which [illegible] an Bedouin camps [illegible] to now itching memories.

Sheikh Suleiman walked over [illegible] as formally [illegible] guests. He had [illegible] a young [illegible] roast in our honor. The most succulent morsels were for us, the remainder for Suleiman, Mohammed [illegible] and the Gaffir. At our request the Sheikh unstrapped his golden-handled sword, [illegible] this he was proud indeed.

Puzzle—How to Measure the Head Without Removing the Headdress

[illegible] as well as those of some of their [illegible] individual [illegible] measurements and [illegible] minutes. Results being tabulated at Harvard [illegible] is a descendant of the early Mediterranean [illegible]

Within a few minutes the young ram, which had scampered away at our approach, had been killed and our calf was being roasted on a spit improvised by Bill Terry from a jack handle. We chewed long on the meat chunks, which tasted like tough and gamy *shish kebab* (kebab on skewered lamb).

After dinner Wendell Phillips, Walt Thompson, and I were escorted by Selmun, his one eye glistening with pride in the lantern's light, across to Sheikh Suleiman's tent, where we drank the bitter black coffee as quickly as possible to ease our good host's mind.

"Dixie" Contrasts with Desert Dirges

All a Mizrai [illegible] who lived a few rods away up a [illegible] stream bed, brought out his *rabab*, a single-stringed [illegible] ancestor of the violin. With his horsehair bow he accompanied himself as he sang magnificent songs telling of the warriors of his tribe and then one of a lovely, [illegible] maiden who could dance divinely.

Sinai Script	Sinai Script Represents	Hebrew	Greek	English
	Ox-head	א	A	A
	House	ב	B	B
	Fish	ד	Δ	D
	Man Praying	ה	E	E
	Fence	ח	H	H
	Palm of Hand	כ	K	K
	Ox-goad	ל	Λ	L
	Water	מ	M	M
	Serpent	נ	N	N
	Eye	ע	O	O
	Throw Stick	פ	Π	P
	Human Head	ר	P	R
	Bow	ש	Σ	S
	Mark of Cross	ת	T	T

From Crude Pictures Our Alphabet Evolved

This table is based on studies by Prof. W. F. Albright, of Johns Hopkins University, Archeologist Adviser, University of Chicago African Expedition. He has made a new decipherment of such Sinaitic writing, at left, in our alphabet (page 618).

As Ali's voice kept perfect harmony with [illegible] song brought delightful memories or anticipations to the shining deep-brown eyes of the group assembled around the glowing camel-dung fire.

Then quietly Walt produced his little harmonica. The soft strains of "Dixie" filled the tent and spilled over into the night outside. Our hosts' brows furrowed deep, for this rhythm was strange to them.

Wendell's fingers were itching. Upon an upturned coffee bowl he began to drum in time to the strains of the harmonica. Gradually the Bedouins grasped the new rhythm and at the end they clapped, something I had never heard before in a Bedouin tent.

Then Ali played a piece on the rebaba and Walt another on the harmonica. [illegible] concert reached its zenith when Wendell [illegible] ring on two upturned basins, accompanied Ali, who first was puzzled, then enchanted.

"Sleeping" Water Pump Awakened

In the morning on the way to Feiran Oasis we stopped at a small mud hut but while Bill [illegible] required two hours to revive this Rube Goldberg contraption. I passed the time in [illegible] camped near [illegible].

At length in the distance I heard the pump snort and sputter convulsively as if in great [illegible] expressed on all faces denoted [illegible]. For 40 days the pump had "slept," to use the Bedouin phrase. Now water would flow once [illegible] this small patch of fenced in [illegible] wood [illegible].

We lunched beneath a vine-covered pergola outside the former residence of the representative of St. Catherine's, now occupied by a Bedouin family. On the opposite [illegible] the ruins of a mill; from the [illegible] tradition holds that Moses watched Joshua defeat the Amalekites while Aaron and Hur "stayed up his hands . . . until the [illegible] 17: 12).

Immediately behind our coal and tent site, surrounded by rich vegetation and [illegible] by palm trees, rose the ruins of ancient Pharan, mentioned as early as the second century after Christ. Later we walked over the low hills, where antique pottery fragments formed a veritable carpet. The capital of a marble column lay half exposed in the dust and sand of centuries. Parts of walls and buildings covered many acres (page 608).

On the hillside above we examined seven

"Here's a Bit of Pottery I Found on a Surface near One of the Graves"

[illegible] cut into the living rock. In one [illegible] Bedouins mounted on white riding camels [illegible] they wanted water or cigarettes. But as we [illegible] the Bedouins [illegible] mile [illegible]

[illegible]

[illegible] Fahel, but [illegible] was that in this solid world [illegible]

[illegible] and in a couple of hours had another pottery data at another [illegible] We bought some coins, found in the ruins of Phenan [illegible]

[illegible]

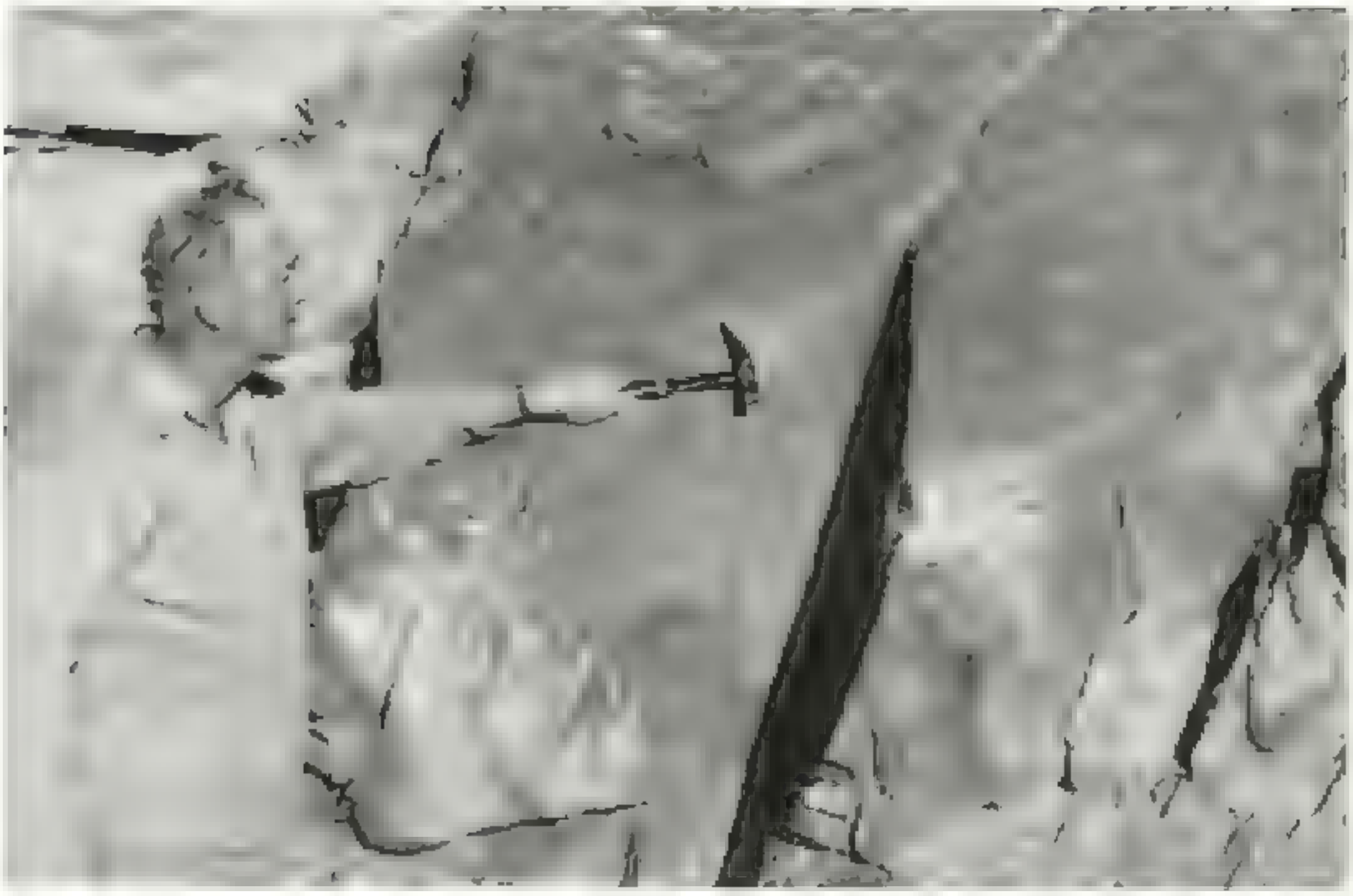
[illegible] dumbfounding by the Quarrels [illegible] ruins. We found no [illegible]

Bedouins Hope for Hidden Treasure

[illegible]

[illegible]

[illegible]



"These Nabatean Inscriptions Are an Ancient Version of 'Kilroy Was Here'"

So says Dr. [illegible] here examining the [illegible] 15 centuries old. Most of their [illegible] are [illegible] and one shows an ostrich, a creature which has [illegible] for centuries the region has been growing drier. Bedouin sheep herds are steadily diminishing.

come in the desert, so I showed no surprise at this voluntary, uninstructed cooperation, but proceeded to oblige him. I gave the man a small coin and three cigarettes for baksheesh. He looked disappointed, even crestfallen. His companion went through the same procedure. Then, sadly, they shook hands, remounted and continued on their way.

As soon as they were out of earshot, I demanded from Selman the reason for their strange conduct. His explanation was [illegible] reasonable.

He said that the Bedouins knew that Professor Albright could not [illegible] for [illegible] pottery, because it was useless stuff. "Not even a camel could eat that." So he must be searching for the golden hoard which every Bedouin knew existed in the mountains of Sinai. Did not three trained excavators (Gufis) accompany us with picks and shovels?

The location of the golden hoard had been handed down from father to son in one family for generations. In some way or other, the Bedouins had connected the scientific practice of head measurement with the location of the golden hoard. They concluded that we were measuring heads to find the man whose combination of measurements would identify him as the keeper of the secret.

When that man was found, they thought, we would ask him about the buried treasure. He would give a password—"Iftah simsim" (Open sesame)—and we would then drive to the spot, dig out the gold, and give a generous share to the lucky Bedouin—enough to enable him to support four wives and live happily ever after.

To complete the legend, Selman explained that the Bedouin who knew where the hoard was hidden did not dare to go there alone because he would be set upon and killed by other Bedouins. On the other hand, if we, foreigners, tried to take more than a just share, the Egyptian Government would stop us. Wasn't that the reason the Governor had assigned Mohammed to escort us and watch our activities?

Thus a fabricated legend may well become part of folklore!

Late that night we reached Abu Zenima, on the shore of the Gulf of Suez. Early in the morning an drove Gen. Abd el Hamid Bey [illegible], governor of Sinai, escorted by two jeeps.

He was in the best of spirits because the local police had captured a hashish (marijuana) smuggler in the neighboring mountains.

The evidence was produced—122 packages of hashish, each wrapped in a cloth bag and stamped with the manufacturer's trade-mark. The cash value was about $50,000—a good haul indeed!

During our last days in Sinai we made a difficult drive to the foot of Serabit el Khadim to visit the Egyptians' ancient turquoise mines and examine the inscriptions on the walls.

For this final phase of the archeological and anthropological reconnaissance of Sinai we had been joined by Drs. John C. Trever, Willard A. Beling, and William H. Brownlee from the American School of Oriental Research in Jerusalem.

We were, therefore, quite a gang as we started our ascent of Serabit el Khadim. We were strung out along the face of the cliff, often hanging by our eyelashes with a steep 500-foot drop below our shuffling feet.

To liven up things, Wendell and Bob would detach a huge boulder, whose bounings echoed up and down the narrow valley. As if this were not enough, they would shout, "There goes a professor!" For those of us unrelated to mountain goats or Beys, this did not make the dangerous passage any easier.

After nearly two hours of hard climbing we reached the summit. Here Egyptian miners of turquoise had built a large temple with elaborately carved stelae, a sanctuary, and cubicles for sleepers. According to Sir Flinders Petrie, who excavated here in 1905, the oldest trace of occupation is the life-size carving in gray marbly limestone of the royal hawk of Snofru, founder of the Fourth Dynasty (2680-2560 B.C.), who favored hawk figures in his temple at Maadum in the Nile Valley.

As we rested on a fallen stela, covered with hieroglyphs, it was pleasant to recall that here had come Petrie, Robert F. Blake, and Kirsopp Lake (the last two from Harvard), and many others, to decipher the ancient tale.

Earliest Writings in Our Alphabet

Albright spent some hours studying the famous proto-Sinaitic inscriptions carved in one of the near-by turquoise mines. These are the oldest group of writings in our alphabet, dating from the early 15th century B.C.

From these crude pictographs, in use 3,500 years ago, have developed the letters in which this article is written (page 812).

The approximate age of these writings is stone is indicated by the ruined Temple of Hathor, "Mistress of Turquoise," which stands on a hilltop near by and bears an inscription showing it was built during the time of Tuthmosis III and Hatshepsut (1501-1480 B.C.). This evidence was now supported by our expedition's discovery of Merkhah Port, from which the turquoise was shipped, and the proof given by its pottery that the port existed about 1500 B.C.

Appeals to "Serpent Lady," and Foreman

With this confirmation for the dating, Albright was able to make a new decipherment of the inscriptions, which are memorials to dead miners written in Cananite characters.

"O Serpent Lady, O Master (of Mines), give a burnt offering," says one as translated by Professor Albright.

"I am one who returned to be with the Serpent Lady, my mistress," reads another.

"A perpetual offering, O foreman of our mine! Give a burnt offering," goes a third.

Professor Albright points out that the idea behind these appeals to deities and overseers apparently was that without their aid the deceased would not receive mortuary offerings and his spirit would suffer the same miserable existence that he himself had endured in life.

The miners were not local Bedouins but Semitic captives and slaves, brought to this hard labor from Egypt and using the language of the country of their origin, Canaan, the Holy Land. Incidentally, these 15th-century-B.C. memorials in the Cananite linear alphabet assist scholars by showing how the parent alphabet developed before the 13th century B.C., when Cananite inscriptions turn up in Palestine.

In the meantime, the rest of the group searched the fallen blocks and the walls of rock shelters for new inscriptions, but with no success. Selman and I collected stone picks and tools used by the miners and washed down into a stream bed just below the temple.

On the second afternoon Terry found the upper portion of a stone shaft on the ridge leading from the turquoise mines. The three Gatis went to work with a will. By the next afternoon the shaft had been opened to a depth of 14 feet. Unfortunately this was the end. The purpose of the shaft remains a mystery.

Glancing around the magnificent panorama for the last time, we scrambled down a steep short cut to camp and drove back to Abu Zeneima.

By now we were anxious to shave and bathe in hot water. Leaving the shore of the Gulf of Suez just as the moon rose, we drove to Suez and through Cairo to reach our base camp at Kom Aushim, on the edge of the Fayyum, just before dawn. The Egyptian Government had proved the best of hosts

28. Our Hoover Dam, World's Highest, Plugs the Colorado and Forms Lake Mead Reservoir

Mapping Our Changing Southwest

By Frederick Simpich

EARLY MAPS [illegible] Boston was 200 years old when men still believed "Buenaventura River" rose in Utah and flowed west to Golden Gate.

When Gen. William H. Ashley camped on Utah's Green River in 1825 men thought rafts could float from there down to St. Louis! And St. Louis itself was 60 years old before we knew its Great Salt Lake existed!

Men still living remember when the first railroad crossed our continent and when some now populous Southwest cities were mere villages.

Phoenix, Arizona, had only 3,152 inhabitants in 1890; now, with close to 100,000, it's one of our most crowded cities. Los Angeles, in 1880, had 11,183 people, and now its area population may be 4,000,000.

Yet our Southwest echoed to the tread of Spaniards in coats of mail decades before Pilgrims landed or Capt. John Smith built huts at Jamestown.*

Hernando de Alarcón explored the Colorado Delta in 1540.

Juan Rodriguez de Cabrillo landed at San Diego, California, in 1542; two years earlier Francisco Vazquez de Coronado had crossed from Mexico into what is now Arizona, hunting the fabled "golden cities" of Cibola.

No maps we know were left by Coronado, whose colleague, Garcia Lopez de Cardenas, found the Grand Canyon. But modern historians, mapping Coronado's march from the narratives, show he got as far east as Kansas.

Oldest and Newest USA Abodes

With this issue of the NATIONAL GEOGRAPHIC MAGAZINE is published a new map of the Southwest.†

It shows scores of towns which didn't even exist until after transcontinental railroads reached southern California in the 1880s. In contrast it shows others, some of Pueblo Indian origin, which are among America's oldest human abodes.

This map replaces an earlier one of the Southwest and takes its place among The Society's large-scale maps of regions of the United States. Previously issued in this series were Northeastern United States; Southeastern United States; South Central United States and North Central United States.

The new map is 34½ x 23½ inches. It charts the Southwest on the Albers conical equal-area projection on the scale of 1:2,500,000, or 39.46 miles to the inch.

Like others in the series, this map serves as an authoritative, detailed reference to the area covered.

New Works of Man Shown

The up-to-the-minute road compilation included digests information given by recent official State road maps and includes the best routes into Mexico. Latest census figures and estimates governed the selection of towns shown. Railroads, canals, dams, and other coastal works of man, numerous here, are marked.

The Southwest region includes the Rockies of Colorado and New Mexico, the Sierras of California, the Grand Canyon of Arizona, and the Basin Region of Utah and Nevada, with its Great Salt Lake and Humboldt River. Its incomparable topography is shown in blue line and brown shading.

Together with the other regional United States maps, this sheet makes an important contribution toward the never-ending endeavor to map the ever-changing, rapidly growing United States.

This new chart includes Arizona, New Mexico, Colorado, Utah, Nevada, and California.

These six States have a total of 21,000 miles of railways and some 315,000 miles of highways.

More than 13,226,000 people, or about nine percent of our total population, now live in this area. Nevada, least settled of all our States, with fewer than two human beings per square mile, has 139,000 of these, and California has about 10,000,000.

More startling than amazing population growth are the changes men steadily make in the aspect of this arid empire.

Warnings to "Take Plenty of Water with You" are posted along highways that lead into some dry, desolate regions; on the other hand, many once-dreaded deserts now yield enormous shares of our food and fatten much of our livestock. Salt River [illegible] and Imperial [illegible] examples. [illegible]

* See "Seeing Our Spanish Southwest," by Frederick Simpich, NATIONAL GEOGRAPHIC MAGAZINE, June, 1947.

† Members may obtain additional copies [illegible] map of Southwestern United States [illegible] and maps published by The Society by writing [illegible] the National Geographic Society, Washington [illegible] Prices, all United States and Possessions: [illegible] paper, 50 on linen; Index 25¢. Outside United States and Possessions: 75¢ on paper, $1.25 on linen, Index, 50¢. All remittances payable in U. S. funds. Postage prepaid.

Edwin W. Pitts

Tiny a Private Fishing Water Skier Handles His Friend's Lemonade in San Diego Bay

With a suitable climate and [illegible] at arm's end. From its way from, [illegible] the Navy's big customers.

of cactus and scrub trees.

Modern Wealth Surpasses Dreams of "Golden Cities"

Miners who [illegible] to the Cascades have given us [illegible] fortunes in gold, silver [illegible] From Nevada's Comstock Lode [illegible] about $400,000,000 in treasure.

Southwest's vast oil fields help run the [illegible] motor vehicles and power plants, and supply petroleum and natural gas for infinite other uses.

One of the world's best potash deposits is worked in New Mexico. Here also are coal [illegible] and lead, with scores of [illegible] the versatile [illegible] to [illegible]

Here in view of snow-capped Sangre de Cristo Mountains lies the [illegible] Alamos, [illegible] Seven Cities in Granada. [illegible] shaky place of shacks, trailers, and ferry-built homes, all dominated by sprawling atomic-bomb laboratories and factories. In the rush and frenzy of war it could grow no other way.

Crowded out, it is hemmed in by Indian reservations. No private person can buy a lot here or buy any land from Indians.

But to make it more habitable for Uncle

In Colorado, the Mesquite Drains into the Sands and Becomes a Lost River

A Indian Spring [illegible] miles to the west, the stream [illegible] reappears. Furnace Creek flows out of the S[illegible] in Greene Mountains [illegible] Death Valley National Monument [illegible]

Sam's swarm-to-service staff, the Atomic Energy Commission works now to make the city a decent habitable place. Now come better housing, schools, playgrounds, a shopping center, a 1,000-seat movie theater, a [illegible] station, bowling alleys, and [illegible] motors.

Manner of migration into our Southwest since traders and trappers opened the Santa Fe and California Trails,* was unique. California's 1849 gold rush lured most migrants straight west. In an odd way this human tide figuratively jumped from the Missouri country to the coast.

Indian dangers helped delay settlement of some Southwest States.

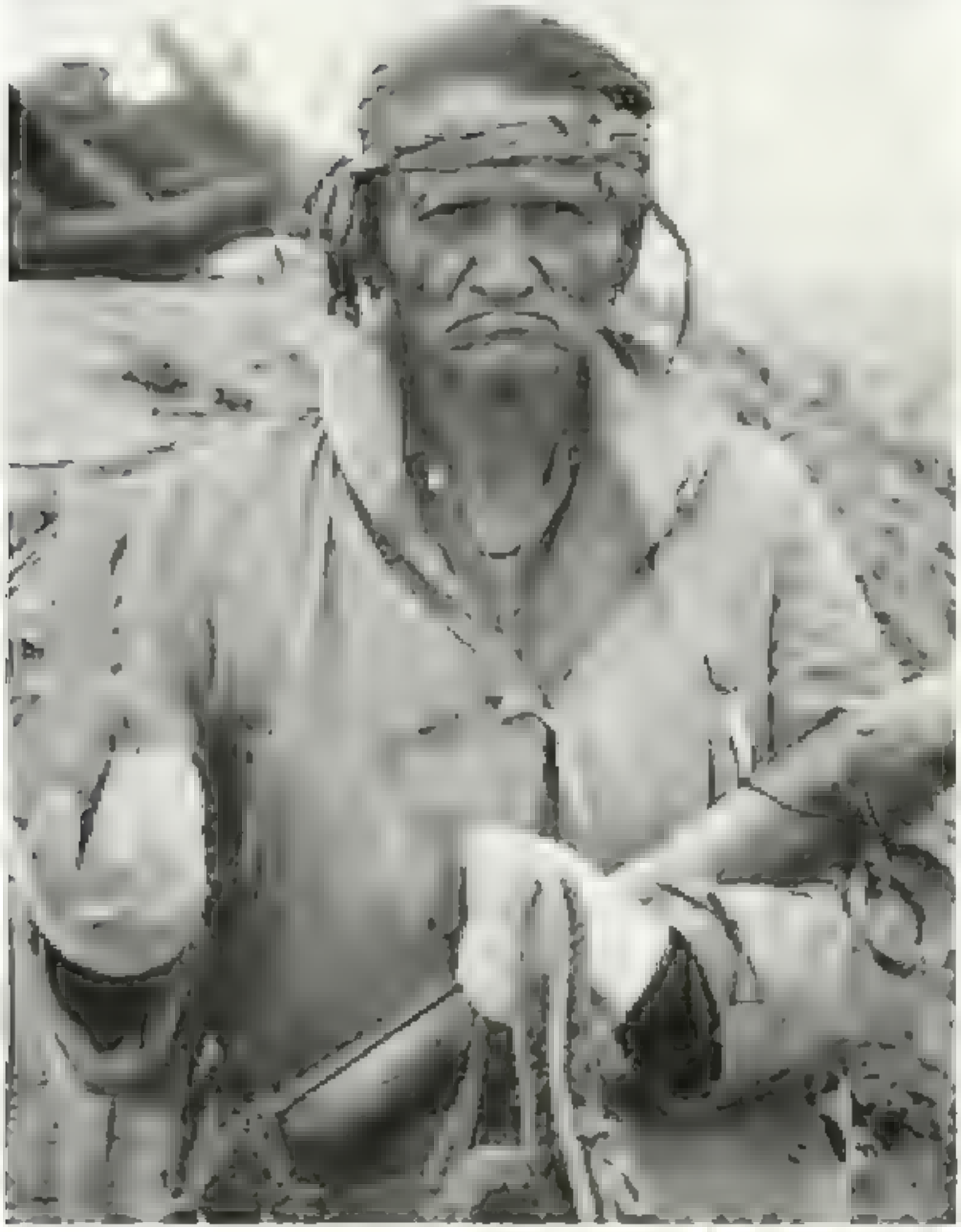
Gold fever had already cooled in California, settlers had turned to growing wheat, and land booms were beginning when Indians still killed Union Pacific construction gangs and scalped Arizona and New Mexico miners and freight wagon teamsters.

Fabulous Pioneer Days

[illegible] was preparing for the Republic's Centennial when the Tucson Citizen was still full of stories of Indian depredations.

Not till 1886, when the notorious Apache warrior, Geronimo, was taken by Lieut. [illegible]

* See "Trails Up Pioneer Roads," [illegible] National Geographic Magazine, [illegible]



Navajo Medicine Man Looks More Like a Farmer than a Doctor

[illegible] of the song ceremonials performed in hope [illegible] the medicine man [illegible] a loss, chanting songs and sand-painting patterns.

[illegible] Texas, produced [illegible] millions in gold and silver.

From Denver we rode west to historic Georgetown, once a famous gold camp. For miles the canyon road that winds to it is lined with abandoned mines where old timers say 50,000 men once dug for treasure.

Colorado, a leader in [illegible] and crops, [illegible] and people like him learned to capture cold [illegible] streams where they [illegible] from mountain [illegible] and spread them over dry valleys to make farms.

The Continental Divide

Audaciously, men here bored a 13-mile hole under the Continental Divide to [illegible] water from the [illegible] River Basin, [illegible] and thus [illegible] and more [illegible] their [illegible].

As we [illegible] the Continental Divide through Colorado, we crossed the watershed [illegible] on the west from slopes on the east which drain into the Mississippi system.

Rich, powerful Denver, noted for green lawns, stands on what was a bare treeless plain.

Colorado is a spectacular State. In its Royal Gorge [illegible] Arkansas River, eastward, [illegible] canyon nearly 2,000 feet deep. Over it, [illegible] feet above, hangs the world's highest bridge.

Here, too, winds [illegible] Mount Evans, [illegible] it climbs [illegible] airplane [illegible].

Here in Colorado giant dinosaurs left their big tracks in old rocks. Other natural won-

dues range from ever-[illegible] dunes in Great Sand Dunes National Monument to mai[illegible] Mesa Verde, among America's best-pre[illegible] ruined villages [illegible] bygone people.*

[illegible] for footsoiled early westbound migrants through it they found no passes. Some went west over the Mormon Trail to the north. Others took the Santa Fe Trail, which tourists still follow over windy, historic Raton Pass from southeastern Colorado to Santa Fe [illegible] goal for years [illegible] freighters from Missouri, including my [illegible]ns' bullwhacking great-grandfather.

Later, railroad engineers studied the mountains [illegible] ghted through them [illegible] its lit another cigarette [illegible] "Let's go!" [illegible] tered Moffat Tunnel through the backbone of our continent. Today this 6-mile tunnel puts Denver on a short straight transcontinental railroad run.

Farmers are tough. [illegible] ears and wear leather [illegible] ches, as the [illegible] says, but they've certainly changed Colorado topography.

[illegible] Prairie Dogs Paid Head Tax. How the Fools Would Roll In?

From New Mexico to the Dakotas these cute little rodents [illegible] pest pastures and ruin [illegible] "dogs" by the troublesome but small enough to cope with their numbers. Prairie dogs like big families, not "planned" parenthood or "spaced" children.

Once there wasn't enough water in Uncompahgre Valley [illegible] what was said at the time to be the world's longest irrigation tunnel through [illegible] of rock and tapped the Gunnison River and poured captive waters through that [illegible] mountain made hole into the Uncompahgre.

Abundant water, soil and sun give the state its chief income from farms and livestock. Its tourist trade makes it more profitable to sell beef and wheat as sandwiches than by the [illegible]. "Colorado" is a big asset, it says, so please don't abbreviate it, but spell it out!

[illegible] take their marbles with them. Stores and factories grow with population. Now the State makes scores of [illegible] generators, explosives, mining machinery, clay products to [illegible] and advertising films.

It mines coal, gold, silver, copper, lead, zinc, and more than half of our molybdenum. Its less common minerals include tungsten and uranium, the latter a source of power for atomic bombs. In its northwest it finds new oil fields.

To this high, cool, captivating Colorado [illegible] Midwest. They climb Pikes Peak, [illegible]

* See "Ancient Cliff Dwellers of Mesa Verde" by [illegible] Mesa [illegible] September 1958.

[illegible] maybe "troll the bones" in such once-rowdy gold camps as Creede and Cripple Creek.

Finally they join that tourist stream through Durango to where canyons hide those mysterious abandoned homes of cliff dwellers.

Empty Homes of Vanished Americans

These empty houses of vanished Americans stretch from Colorado to Arizona.*

Our cross-country motorcars shuttle this Southwest, mostly on U. S. Route No. 66. From two to three million a year ride these trails in New Mexico and Arizona, and to and from California.

Many stop at light-hearted, fiesta-loving Santa Fe. Remember Willa Cather's *Death Comes for the Archbishop*. From there up the Rio Grande an Indian-village-bordered road leads to ancient Taos. "Mountain men" met there to carouse, dance fandangos with swarthy senoritas, and trade furs for traps and ammunition. Kit Carson's grave is there, and an art colony which began more than fifty years ago when pioneer painters came and started using Indian models.

It was after the close of the War with Mexico in 1848 that we got most of this Southwest. One cause of that war was disputes between us and Mexicans over southwestern trail and trade problems.

Much of today's vast Santa Fe Railway system closely parallels the Santa Fe Trail, [illegible] as much of the Southern Pacific system [illegible] that kept 1,500 horses and mules galloping between St. Louis and San Francisco via warmer, more level Southwest pathways.

But wait a lopsided United States map would still be if all our western trade routes now ended at Mexican customhouses on that international border as roughly drawn between us and Mexico 100 years ago!

What a fateful day for all Americans when Gen. Stephen W. Kearny raised the Stars and Stripes over the ancient Palace of the Governors at Santa Fe and said:

"New Mexicans! We have come among you to take possession of New Mexico, which we do in the name of the Government of the United States. We have come as friends, to better your condition and to make you a part of the Republic of the United States . . ."

Taking Kearny at his word, New Mexicans from that day became patriotic, useful American citizens, as witness their fine record in our World Wars and in public life.

Mexican brawn to this day largely works the Southwest mines and forests, maintains its highways and railroads, herds its cattle, shears its sheep, and harvests its crops.

In that sunny, pleasant land today are around 1,000,000 people of Spanish-Mexican racial origin, and in some areas you still hear more Spanish than English, as in Rio Arriba County, in northern New Mexico.

This was Spaniards' country for more than 300 years. Among their oldest-known written records is the Spanish explorer Juan de Oñate's lines etched on Inscription Rock, in El Morro National Monument in western New Mexico. In translation it reads:

> Passed by here the adelantado Don Juan de Oñate from the discovery of the sea of the south on the 16th of April, 1605 [sometimes read 1606].

Oñate meant he had seen the Gulf of California.

To reach this rock you ride southeast from Gallup, New Mexico, where each year is held the great Intertribal Indian Ceremonial with sand painters, rug weavers, Navajo silversmiths, dancers, and brandishers.

This colossal rock rises beside an early Indian trail, and on it are scratched the names of many pioneer Americans who also "passed by here."

Another famous New Mexico rock is historic Acoma, with an ancient Indian village on top of it. From here Spaniards once jumped to save their lives. No "battle above the clouds" was ever more astounding!

Spanish soldiers who climbed this rock were set upon by Indian villagers.

Seeing their brothers being brained, surviving Spaniards leaped from the parapets of this sky city and dropped into soft, sloping sands drifted about the foot of 357-foot cliffs. Of the five who jumped, four lived!

Our First State History

In Albuquerque I talked with Gilberto Espinosa, one of whose ancestors came with the Conquerors; for the Quivira Society he translated Gaspar Perez de Villagrá's *History of New Mexico*, first published in Spain in 1610.

Villagrá's is a "rhyming history"—the first of all our State stories—and it details the horrible butchery high atop Acoma Rock. You can reach it now by automobile, and have a goat meat and corn meal lunch with present day Indians for a dollar.

It's on the sandy waste, not far from here, that Uncle Sam now tries guided rockets.

This Southwest is still Indian country; here you will find thousands of Apaches, Pimas,

* See "Indian Tribes of Pueblo Land," by Matthew W. Stirling, NATIONAL GEOGRAPHIC MAGAZINE, November, 1946.

A Victim of Greed Teaches the Lesson, "Don't Bite Off More Than You Can Chew"

[illegible] found in Lake Mead [illegible]. The bird died [illegible]

[illegible] Apache, Ute, and Navaho [illegible] most countries, are [illegible] people whose ways of life [illegible] and hunger [illegible] rather than flee to those they have not. What makes calamity of such [illegible] for them is barren reservation lands, lack of water, and tuberculosis.

Life Along the Mexican Border

[illegible] the other [illegible] the State legislature.

The Southwest [illegible] Mexico [illegible] follows [illegible] from the [illegible] miles west to [illegible] the Pacific [illegible] south of San [illegible].

[illegible] up to [illegible] the Rio Grande forms the [illegible] the world's [illegible] known to change its course [illegible].

[illegible]

* See [illegible] National Geographic Magazine [illegible]

A Woolly Army in Single File Follows Its Leaders into a New Mexico Canyon

This herd, photographed six miles east of [illegible], eats out a home on ranges so dry that cattle or horses [illegible] to burn

farmers who thought they lived in Mexico wake up to find themselves in Texas, or vice versa.

On our map you see this Rio Grande rising away up on the Continental Divide, in southwestern Colorado, near where 11 members of Col. John C. Frémont's party froze to death in 1848 when hunting [illegible] a railroad [illegible]

The whole tortuous course of this great river was traced in 1938 by the National Geographic Society.* From a rocky land of trembling aspens, beavers, blizzards, and mountain sheep the party worked its long way down to the hot, lush lowlands of Mata moros bullfights, Brownsville orange groves, Gulf hurricanes, pelicans, and tarpon. On their way, Indian guides killed three mountain lions, which we helped eat.

You don't realize how wild much of America still is till you explore certain remote areas of this Southwest. Parts of Utah are so overrun with crop-robbing deer that farmers are frantic. In other places you may ride 50 miles and never see a house.

Mountain lions are so numerous that in some rougher regions it's almost impossible to raise colts. Often you see full-grown horses with their backs all scratched up from attacks by these big cats. Many cross over from Mexico to hunt meat on our border cow ranches.

You see their tracks along stream beds. On a few mountain paths, as in the Texas Big Bend, you should watch your step, lest you put your foot in a foot trap which some outlawed rancher has set for a bold marauder that has been killing his stock.

Each year Uncle Sam's official hunters of these predators kill them by dozens.

A Frontier That Made History

In southern New Mexico, near El Paso, the international line crawls from the Rio Grande and starts west, overland. Here stands Monument Number One, the first in a long string of stone and iron obelisks which marks the land boundary extending westward [illegible] and in [illegible] may know just [illegible] these monuments are [illegible]

[illegible]

. . . Drinks at a Drying Water Hole, and Scales the Mesa's Ramparts for Meager Grass

Southwestern sheep were introduced by Spaniards. Multiplying on Indian land, they create a tremendous erosion problem.

Near Nogales, Arizona, [illegible] the boundary break off northwest [illegible] west. Had it run straight west, we would now own all the Colorado River Delta and more of Baja, or Mexican California. Some claim this was originally meant to be ours, under the Gadsden Purchase, but that somehow the ruler "slipped" when the new border was [illegible].

Always, since Mexico invaded Texas and Santa Anna fought Sam Houston at San Jacinto, and Gen. Zachary Taylor marched for Monterrey, Mexico, in 1846, events along the line have made front-page news.

Lusty Annals of the Border

[illegible] here after 35,000 [illegible] Emperor Maximilian [illegible] to be shot and have his Empress Carlotta go mad.

Adventurous border annals show how time and again filibusters have crossed the line either to found colonies or foment revolution. Some were commercial forces; some were [illegible].

Spectacular was the attempt of Henry A. Crabb to settle his party of Californians in Sonora in 1857. Crossing from Arizona, his party was attacked at Caborca, 60 miles south of the border, conquered, and all except one boy were executed. Crabb's head was cut off and exhibited in a jar of alcohol. On the bullet-scarred walls of the old Caborca Mission you can see a metal tablet, set up by the Mexicans, marking the site of the battle.

Bandit leader Pancho Villa jumped the line to raid Columbus, New Mexico. Gen. John J. Pershing's punitive expedition chased him deep into Mexico, only to lose him. But what a night! Fine American 10th Cavalrymen I knew died on that dash down into Chihuahua.

As American consul I was stationed at Nogales, Sonora, just across the line from the Arizona town of the same name, during the Carranza revolution.

Once fighting got so hot that Gen. Alvaro Obregón hurled his dead where they fell some on my tennis court.

To get some sleep, I borrowed a baggage car from the railroad company, put my staff and archives on board, and a switch engine pushed us across to Arizona. Gen. Fred Funston, coming to call, said, "This is the first

With Fast Fists and Horse-smashing Heels, a Wild Horse Fights His Way Sideways

[illegible]

[illegible] Mexico's Southern Frontier

[illegible] Southern Costa Rica [illegible] the Southern and Mexican [illegible]

[illegible] Mexico [illegible] Southern [illegible] Mexico [illegible]

[illegible] Spanish [illegible] Southern [illegible] Southern [illegible]

[illegible] Mexico [illegible] Southern [illegible] Mexico [illegible] Southern [illegible] Mexico [illegible]

Desert Sentinel for Sahara Mosques

[illegible]

That will be a company of motion-picture actors working out here on the desert—which is good African scenery.

"Naked as Adam and Eve." That's how [illegible] when Father Eusebio Francisco Kino passed this way and was convinced California was not an island.

They're still here, these Yumas. And still their bucks may kill rabbits with sticks and plaster their hair with mud to kill the lice. But squaws wear petticoats now and squat on Yuma's railway station platform, peddling their crude wares to tourists.

The Colorado River separates Arizona from Nevada and from California, as the map shows. Till man tamed it, its river ran wild. Once, in flood, it slipped off the ridge on which its lower reaches run and scoured deep channels into Imperial Valley to fill Salton Sea. Hereabouts people live 200 feet below sea level.

Hoover Dam, world's highest, blocks this river between Arizona and Nevada to form 115-mile-long Lake Mead, whose big fish explore water-filled caves in submerged canyon walls (page 816). Over the dam's crest [illegible] highway till it was built, no wheel [illegible] the Colorado's River portion [illegible] Nevada-Arizona border.

Water for Seven States

Equitable division of this river's water among the seven states it drains is one of the riddles of the West. But that's another story—a long, hard one.

Throngs of people would have to move out of southern California today were it not for water taken from the Colorado near Parker Dam (below Hoover Dam) and carried over deserts and under mountains to serve farms and cities. Even the Colorado is insufficient; now the Golden State talks of bringing water from Columbia River sources in faraway Idaho, and even of taking water from the Pacific and desalting it!

California! That very name evokes an image: Yosemite, Golden Gate, Big Trees, oranges. Sir Francis Drake's *Golden Hind* anchored off its coast, and Drake came ashore to claim the land for his Queen.

What geological confusion! Mount Whitney [illegible] Death Valley, our deepest depression [illegible] rails, airlines run into California from north and east and from Mexico, and air and steamer lines tie it to Pacific ports.

It still mines gold and saws timber, but its infinite factories, its oil and gas, its colossal farm, orchard, and vineyard areas yield now many times all the wealth that ever came from its gold mines.

Flying east from its Edenlike valleys, as from Sacramento to Reno, you see another world unfold—an empty world of dried-up lakes, happily broken by irrigated valleys green with alfalfa and waterless canyons choked with verdure and ensoul with the song of birds. Ghost towns litter around some worked-out bonanza mines that made men rich beyond their dreams.

Every year Nevada State chemists still assay 5,000 to 6,000 ore specimens, and nearly every one of the 12,500 people in the Ely area earn a living, one way or another, working the giant copper mines. One of earth's biggest man-made holes is the open pit mine near Ruth, from which more than 230 *million tons* of material have been hauled! All the trucks in the world couldn't hold that pile!

Gay, glittering, and rolling in money, open-all-night and carefree Las Vegas, "City of Chance," in southern Nevada. It says it has sun by day and fun by night. It's old. It was a fort, a Mormon outpost, a wayside stop for water, but it boomed when near-by Hoover Dam was being built. Now it's Nevada's second city. Visitors flock to see the great dam, to bask in this Cairolike climate, or to flirt with fortune at the gaming tables along "Glitter Gulch" and neon-lighted "Sunset Strip."

Wealth of a "Wilderness"

Enlarged photographs of moon valleys and craters come to mind when you fly back over empty areas on the way to Utah. As your plane's shadow sweeps over vast dry flats left by receding Great Salt Lake, where racing drivers set world records and rich speeding motor trucks in leagues-long straight lines, you may reflect, "What a worthless wilderness!"

But come back later, on the ground, and look! Mountains of potash are recovered, as around Wendover; and the strange dead sea itself is virtually an inexhaustible source of salt taken from its bitter waters by solar evaporation.

It's like flying over the Sahara and coming suddenly upon Cairo and the Pyramids to cross this salty waste, late on a summer afternoon, and glimpse the glistening towers and temples of Salt Lake City reflecting the sunset. Truly it seems a dream city then, like some imaginary New Jerusalem of the ballads, or maybe such a golden city as Coronado went seeking.

High mountains form a backdrop where ski fans frolic in snowy times, where sheep

climb up to graze in summer, and where Salt Lakers build cottages and whip the rushing brooks for trout. All up and down scenic Salt Lake Valley fat cattle feed in green pastures, and water flows through neat irrigation ditches, as laid out when Brigham Young brought his Latter-day Saints here and said, "This is the place."

The mysterious Temple, the sea gull monument, the Lion House where Brigham Young and his large family lived, the many Mormon cooperatives—including their great department store—and the vast high-domed Tabernacle with its amazing acoustics and great pipe organ, have all been objects of interest to decades of visitors.

But few transients realize the economic power of Utah or its strategic place in our changing Southwest.

Farming was the State's first business. Its orchards are fragrant; its honeyvales are musical with soft moos and excited cackles. But today half its people make a living, one way or another, from the mines.

Moving a Mountain—for Copper

America's largest surface copper mine is that of the Kennecott Copper Corporation at Bingham Canyon. Here puny man has literally moved a Gibraltar-like mass of earth; he moved what was a mountain and left a hole in its place.

Miles of road grades run around the inside slopes of this hole, making ridges that look like the terraced rice fields of Luzon Igorots. Terraces are laced together by a switchback railway for ore trains.

In late afternoon, powdermen blast more ore from the sides of the big hole. Then smoke, dust, and rocks fly high in the air; workers run for cover, and the roar of the great explosions echoes back and forth among the peaks like artillery fire between opposing armies.

Greatest known concentration of coal in the United States lies under southwest Wyoming, western Colorado, and eastern Utah. Salt Lake Valley is now our chief smelter center for copper and lead.

With such abundant coal, as well as iron ore, copper, lead, zinc, gypsum, and limestone, Utah is the government source for pig iron, coke, cast-iron pipe, steel and steel shapes, as well as copper ingots and gypsum plasterboard for the factories and foundries and builders on the Pacific coast. On our new map railway lines show how well Utah is located as a pivotal center for shipments of these materials to any port from Seattle to San Diego.

The so-called "colonial status" which our west coast long held, with relation to the more mature industrial development of our East, is largely changed since the war.

This came when Uncle Sam spent billions on munitions plants, chemical works, airplane factories, and shipyards west of the Rockies. Here in Utah he built plants to make arms, gasoline, parachutes, radar tubes, chemicals—many things. Here, too, he built one of Navy's largest supply depots, Air Force repair shops, and great ammunition storage dumps (because this was a safe place). Here, also, he built giant steelworks.

Since Union Pacific Railroad came in 1869, Utah has produced more than two billion dollars in base and precious metals, but it was the war boom which brought such works as the $200,000,000 steel plant at Provo. Now privately owned, this plant yields some 1,200,000 tons a year of billets, plates, shapes, and strips in coils. This product is also being shipped, in part, to the steel mills in California.

What changes! There wasn't loose iron enough in the whole Rocky Mountains even to shoe their teams or make a keg of nails when the forty-niners passed this way.

Some one little California city, say Palo Alto or Eureka, probably holds more whites now than lived in that whole State when gold seekers first staked claims and shot the claim jumpers, or when Commodore John D. Sloat of the U. S. Navy dropped his mudhook at Monterey and run up the American flag on July 7, 1846.

There's as much snow now in Sierra Nevada gorges as when the starving snowbound Donner party was trapped there; but today the shouting ski jumpers rejoice in drifts.

Pioneer immigrants hated and feared the desert, as what lost Jayhawkers suffered the thirsty horrors of dreadful Death Valley. Now, as at Palm Springs, where main-street city lots have sold for $1,000 a front foot, winter visitors pay $30 a night at ritzy hotels merely to *sleep* on the desert!

New Names Appear on Map

Mountains are where they were. So are rivers' rocky gorges and the ancient pueblos. But still more deserts turn to gardens. Mushrooming new towns surprise even the Southwest. Each year new place names appear on the map; new factories belch fresh smoke, new generators whirl at new power dams, and still the migrant tide pours in.

Sit quietly in any roadside motor court when the day's rush has ebbed, and in fancy you hear the tramp of westbound millions.

For additional articles on the States covered see the NATIONAL GEOGRAPHIC MAGAZINE Cumulative Index.

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[illegible] the purposes [illegible] the National Geographic Society [illegible] Magazine [illegible]

Articles and photographs are desired. For [illegible] The Magazine [illegible]

In addition to the editorial and photographic services [illegible] the Society has sponsored more than [illegible] expeditions, some of which required years of field work to [illegible]

The Society's [illegible] expeditions have probed back the [illegible] of the southwestern United States [illegible] months before [illegible] the Atlantic. By during the years of the [illegible] in that region, The Society's [illegible] volume, which it has [illegible] for [illegible] years.

[illegible] Society and the Smithsonian Institution [illegible] work [illegible] Asia [illegible] Splendid Cities [illegible] Southwest [illegible] Great Indian Kingdoms [illegible]

[illegible] 1937 [illegible] by the National Geographic Society and the U. S. Army Air Forces, the world's longest [illegible] recorded [illegible] Capt. Albert W. Stevens and Capt. Orvil A. Anderson [illegible]

The National Geographic Society–U. S. Army Air Forces Expedition, from a [illegible] in southern Brazil, photographed and observed the solar eclipse of [illegible]. This was the seventh expedition of The Society to observe a total eclipse of the sun.

The Society cooperated with Dr. William Beebe in deep-sea exploration off Bermuda, during which a world record [illegible] was attained.

The Society gave [illegible] in addition [illegible] to the Government [illegible] the congressional appropriation [illegible] for the purpose was [illegible], and the [illegible] of the giant sequoia trees in the Giant Forest of Sequoia National Park [illegible] were [illegible]

[illegible] Washington [illegible]

To Peggy —

for marrying me in the first place . . .

for [illegible]

for [illegible]

for [illegible]

for [illegible]

for [illegible]

for [illegible]

for [illegible]

for [illegible]

for [illegible]

Jane

This Christmas make sweetest heart sing [illegible]

[illegible] $7.25 [illegible]

[illegible] $71.50 [illegible] $100.

[illegible] $60.50 [illegible]

[illegible] $ 5.00 [illegible] $ 80.

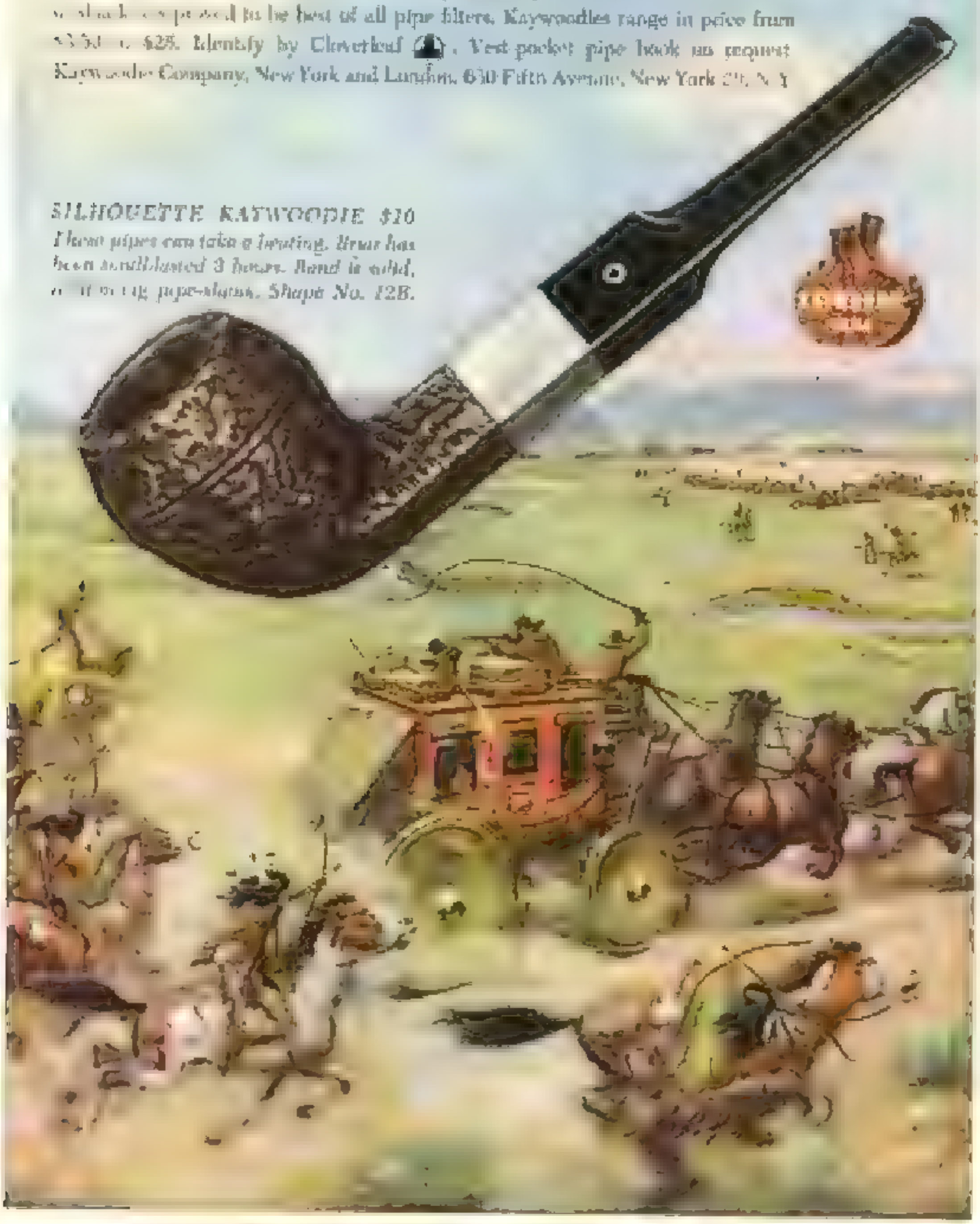
[illegible] 300 [illegible] $182 [illegible]

A TRIUMPH OF AMERICAN GENIUS

Hamilton

KAYWOODIE REMEMBERS WHEN—

Our organization of pipe makers was just 17 years old when the Indian attack took place in Wyoming in 1866. Our people travelled the rugged trail across the country in those days to see their customers. Making the best pipes has been a tradition with Kaywoodie pipe-makers for 67 years. Kaywoodies are unsurpassed for smoking quality, beauty of workmanship, and long service. "Drinkless" filment which has proved to be best of all pipe filters. Kaywoodies range in price from $3.50 to $25. Identify by Cloverleaf. Vest-pocket pipe book on request. Kaywoodie Company, New York and London, 630 Fifth Avenue, New York 20, N. Y.



SILHOUETTE KAYWOODIE $10
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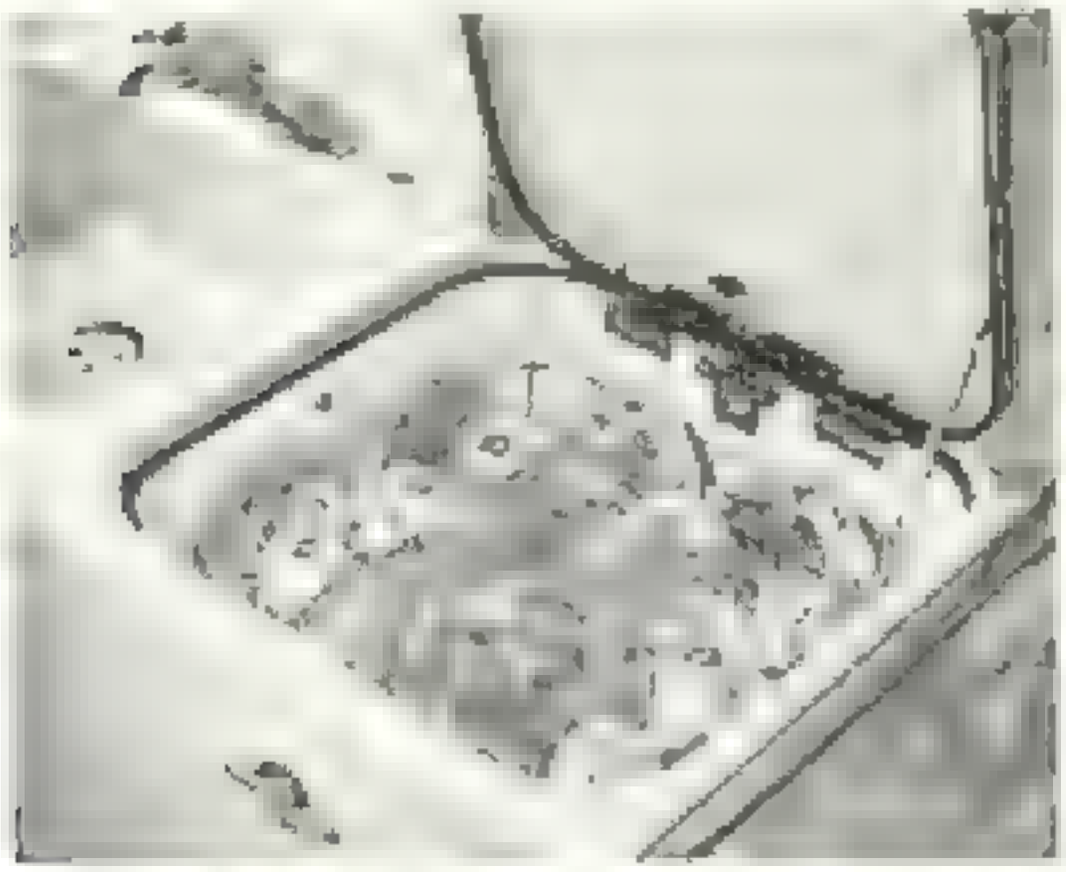
THE KITCHEN THAT'S A SLAVE TO YOU

(Instead of vice versa)

IMPORTANT NOTE [illegible]



Automatically the G-E Dishwasher [illegible] keep clean and drive [illegible] *of dishes are cleaner than if done by hand!*

Automatically, the G-E Disposall [illegible] Magically, [illegible] Disposall [illegible] self-cleaning, and can be used with septic tanks of sizes, [illegible]

*General Electric is registered trade mark for its [illegible] of appliances.

GENERAL ELECTRIC

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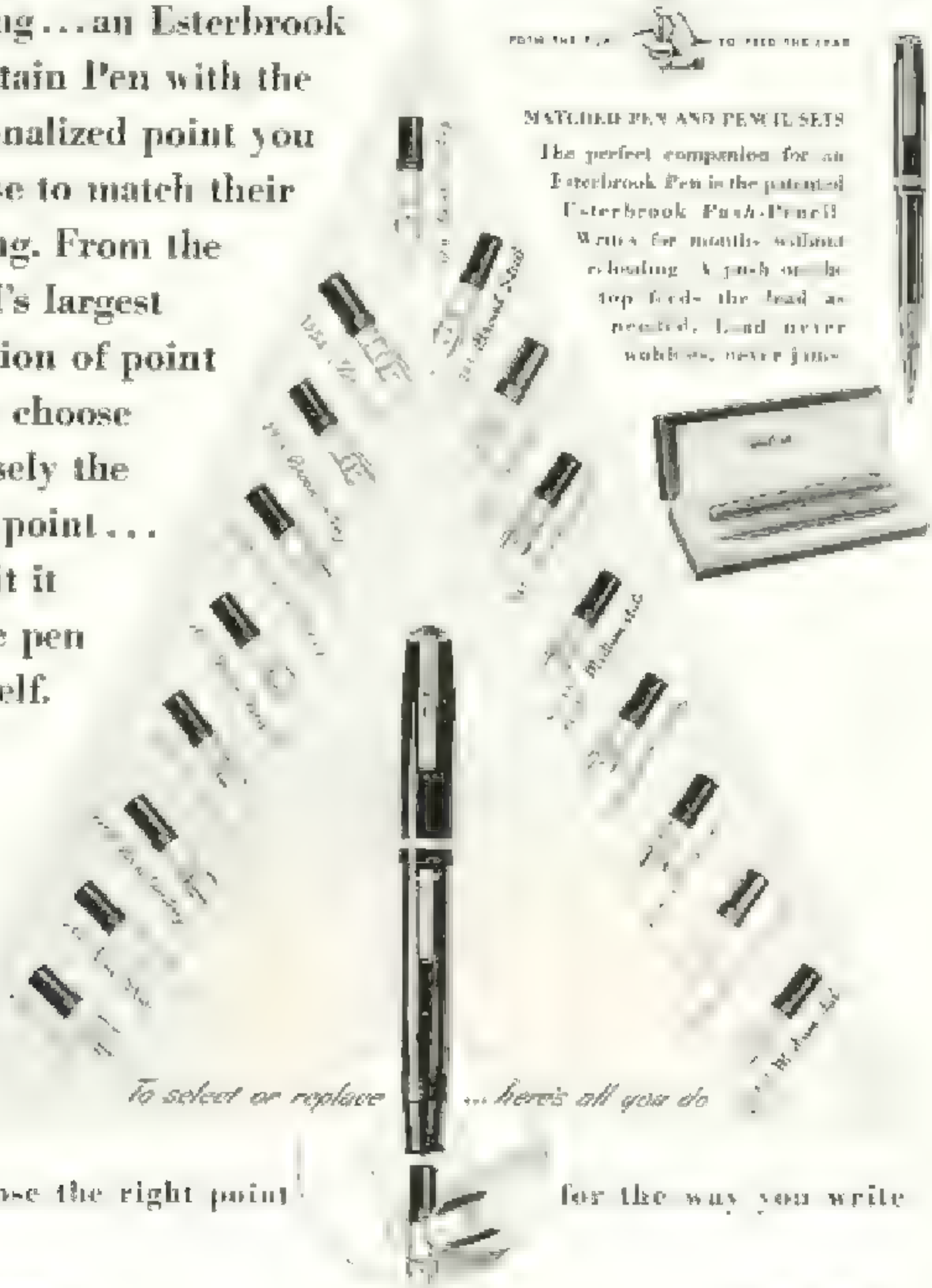

To select or replace ... here's all you do

Choose the right point for the way you write

Esterbrook

FOUNTAIN PEN

"I knew I could forget... all he ever think of is ever wear PLYMOUTH"

HOW TO GIVE THE MAGIC TOUCH OF HOLLYWOOD TO PERSONAL *Color Movies*

FILMO AUTO LOAD CAMERA

FILMO AUTO-S CAMERA

FILMO COMPANION CAMERA

[illegible]

[illegible] purchase a [illegible] Other [illegible] to better photo[illegible]

Has the high cost of living sent your table costs sky high, too?

We're just as troubled as you are about high prices. They mean that fewer people can buy. And that's not good for anyone.

[illegible] this trend by doing [illegible] and quality up. [illegible] meet at a [illegible] National [illegible] quality at lowest possible prices.

Here are some figures which show how milk prices compare with food prices, from [illegible] 1948:

Increase in cost of food	116%
Increase in cost of fluid milk	78%

Notice that milk has not [illegible] as much as the average of other foods. Our price [illegible] of our milk [illegible] averaged less than [illegible] in 1947—far less than the price [illegible] business [illegible] and much less than the average price in all industries.

Milk [illegible] perfect food, gives [illegible] people [illegible] of Wisconsin [illegible] milk—and [illegible] *the largest* [illegible] *at the lowest possible prices.*

An impartial [illegible] Americans [illegible] profit [illegible] average [illegible] is less than [illegible] National Dairy's profit in its milk [illegible] 1947 was less [illegible]

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THE FINE STATIONERY
IN THE PLAIN BOX

AMERICAN STATIONERY

[illegible]

Bacteria bigger than a Terrier

Once scientists, exploring the invisible, worked relatively blind. Few [illegible] more than [illegible] bacteria. Many molecules and most viruses remained [illegible]

Then RCA scientists speeded new world [illegible] with the first commercially practical electron microscope. In the laboratory it has secured magnifications of 20,000 diameters and over. 100,000 is commonplace . . .

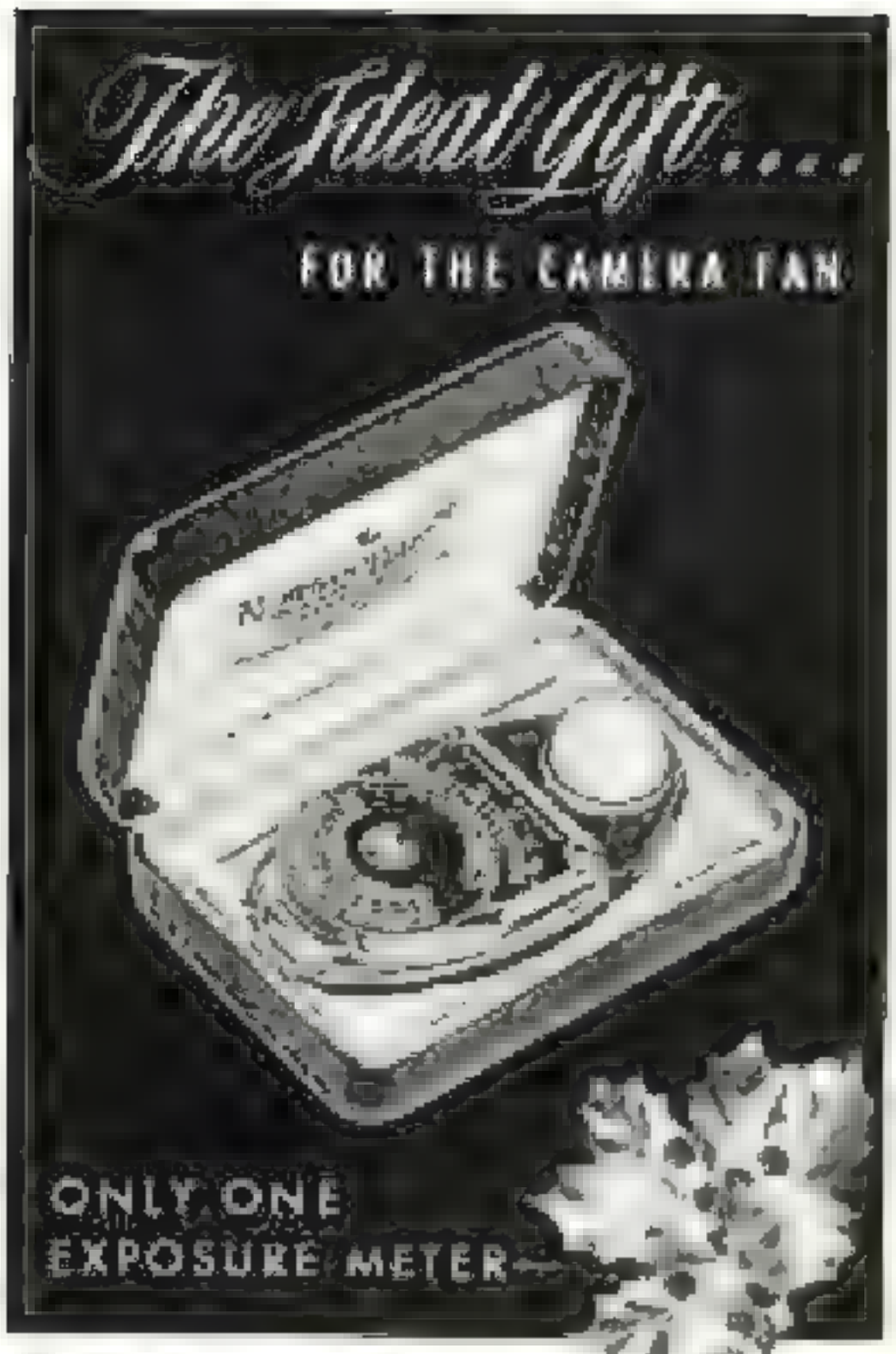
[illegible] such figures, picture this: A man magnified 100,000 times would tip with his head in Washington, D. C., and his feet in New York . . . A fly similarly magnified would appear as large as the Washington Monument.

Scientists see both bacteria and viruses—and have even photographed a molecule! Specialists in other fields—such as industry, mining, agriculture, forestry—have learned unsuspected truths about natural resources.

Development of the electron microscope as a practical tool is [illegible] example of RCA [illegible] Thus leadership is [illegible] all instruments keeping [illegible] names RCA [illegible] and RCA Victor.

[illegible]

RADIO CORPORATION of AMERICA



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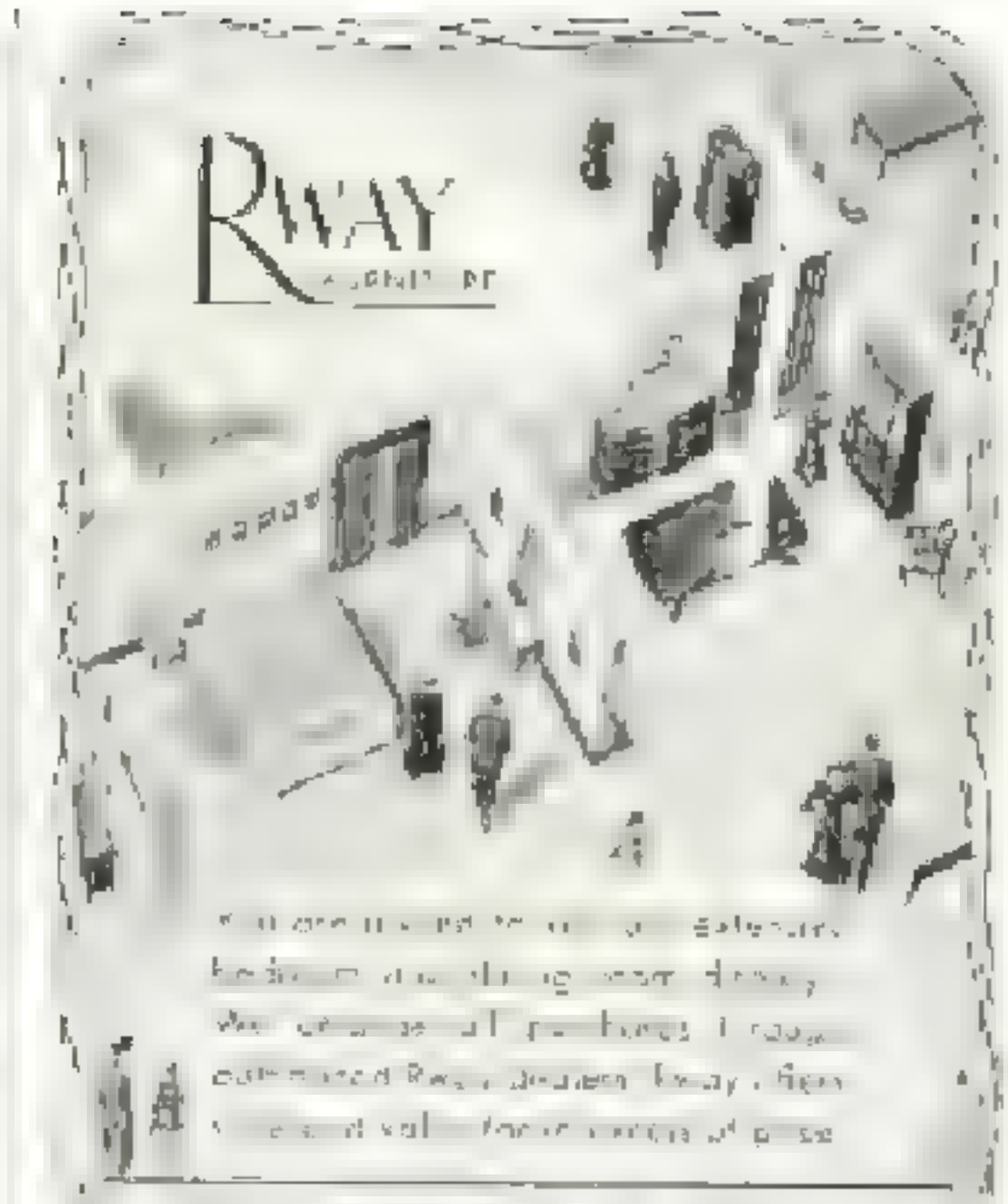

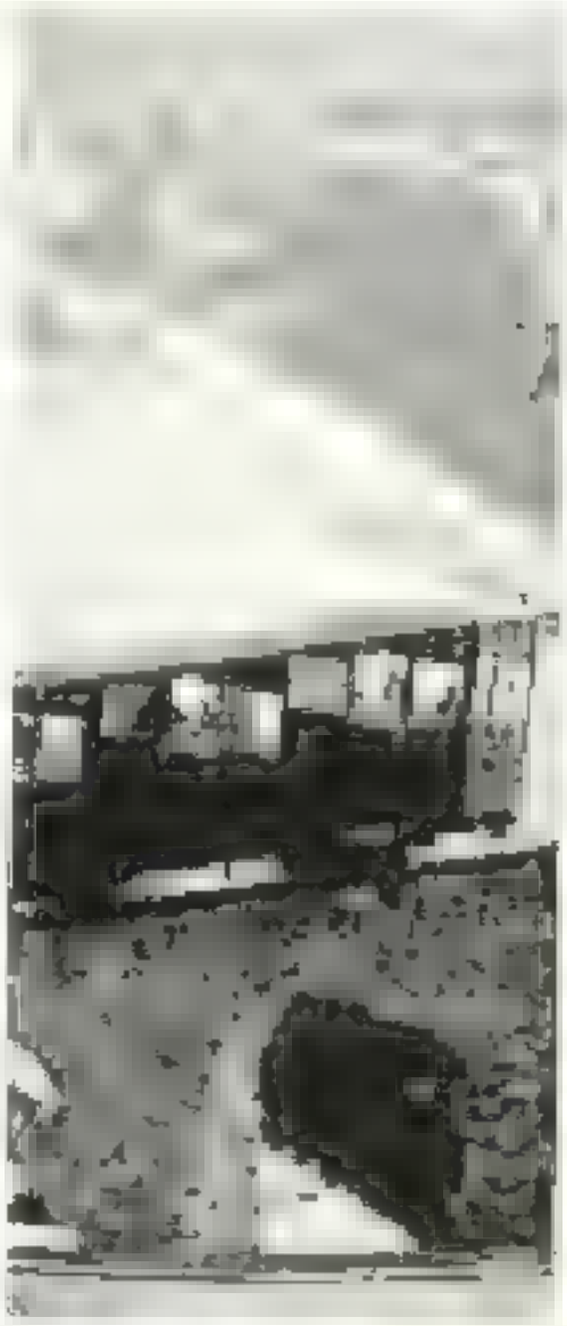

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This year give Revere . . .

for a Christmas they'll never forget!

Home movies are becoming a Christmas tradition. When [illegible] appears to the [illegible] for the "Big [illegible]" [illegible] is part of the Christmas picture. You'll want glorious [illegible] movies of all the joyous events . . . of those many priceless moments the whole family will enjoy [illegible] again and again. So make this a Christmas they'll never forget . . . give a Revere! See your dealer now.

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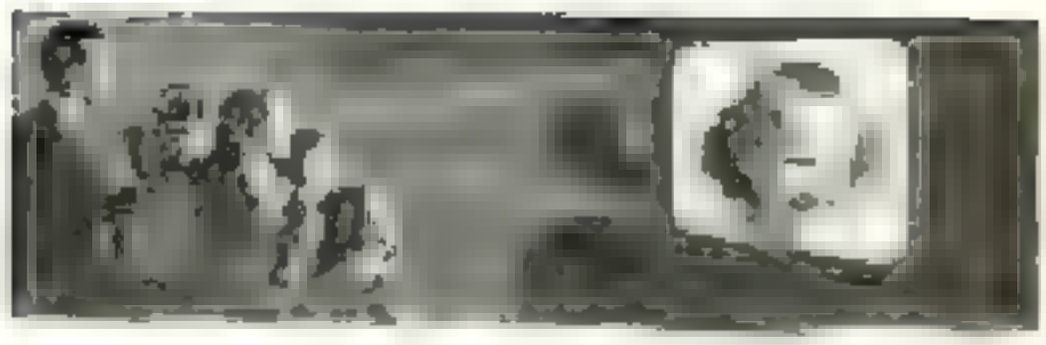

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For that extra quality that enriches your pleasure

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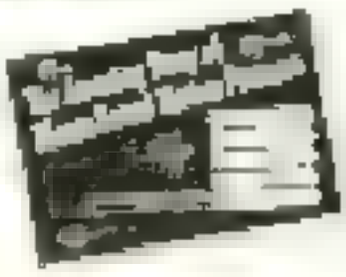
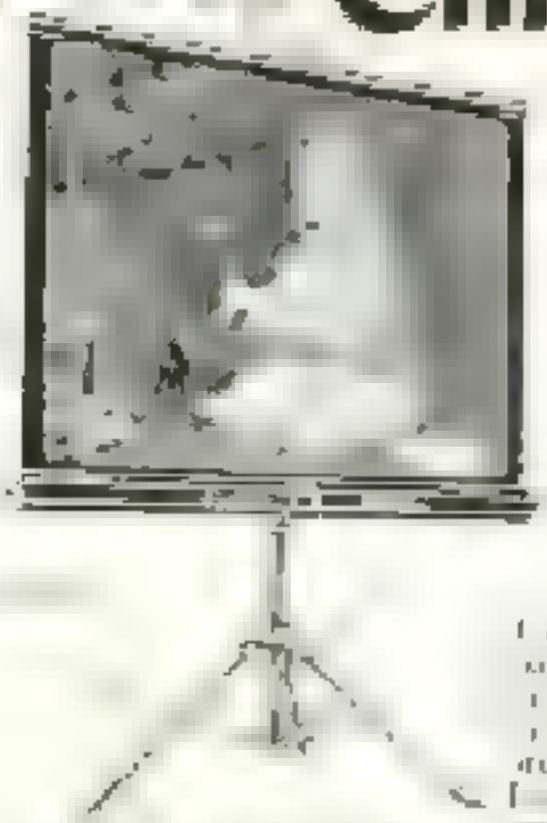


AMPRO PRECISION CINE EQUIPMENT

This Christmas



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The SHERATON PLAZA

DAYTONA BEACH, FLA.

Directly on the Ocean

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FOR THE MOST VALUED OF YOUR FRIENDS...

PERFECT GIFT TO KEEP THEM THINKING OF YOU!

IT GIVES INDIVIDUALITY TO YOUR GOOD WISHES!

Parker "51"...world's most wanted gift pen

YOUR GIFT OF PARKER "51" IS CERTAIN TO WIN A DELIGHTED WELCOME. FOR HERE IS THE WORLD'S MOST WANTED PEN, AS CONFIRMED BY 83 SURVEYS IN 23 COUNTRIES.

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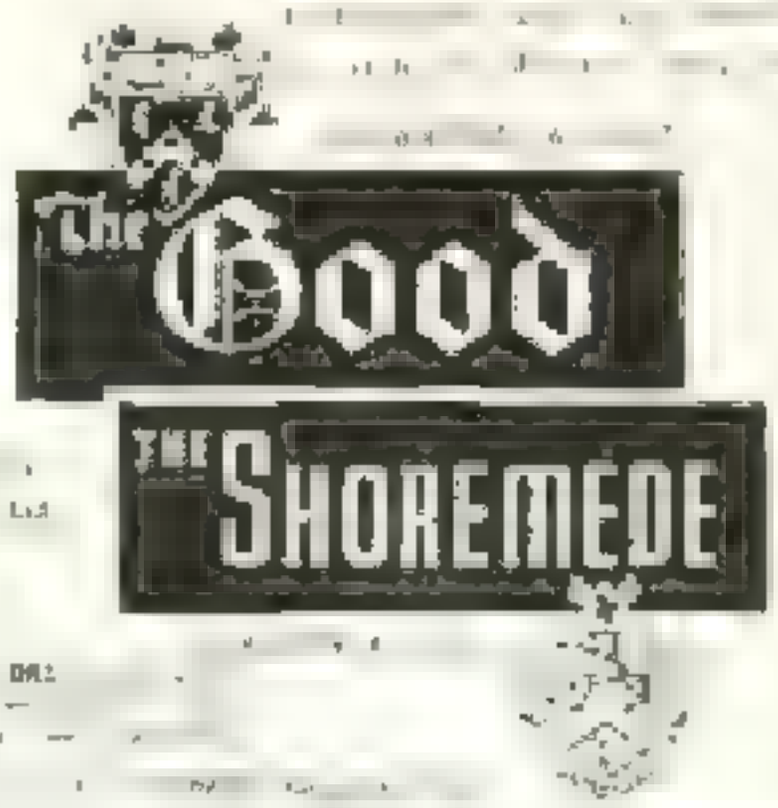

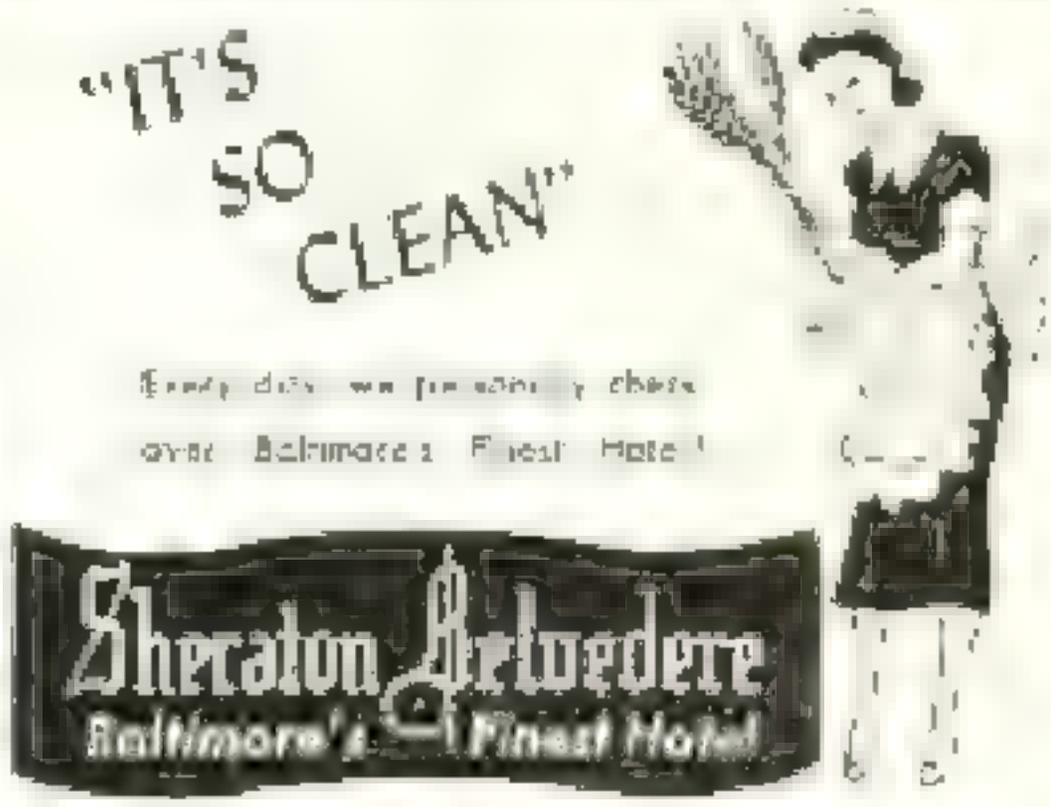

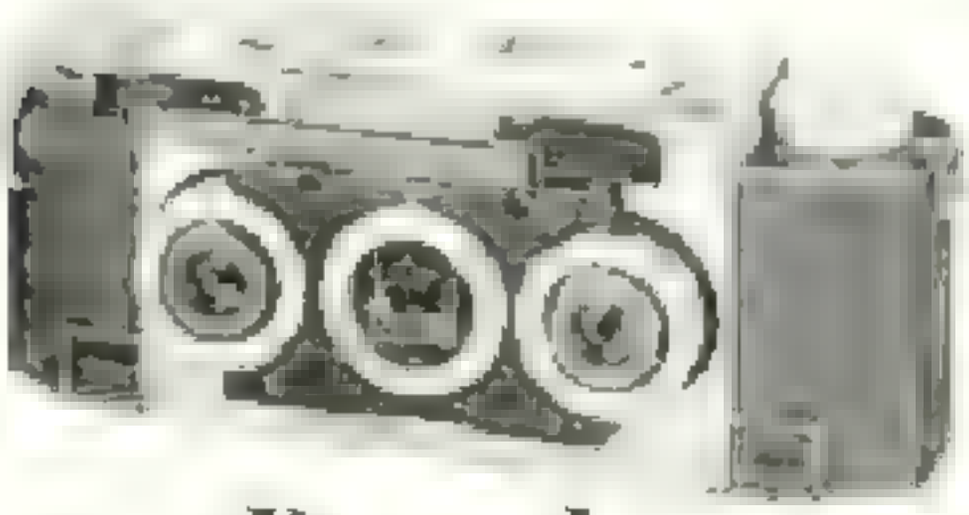

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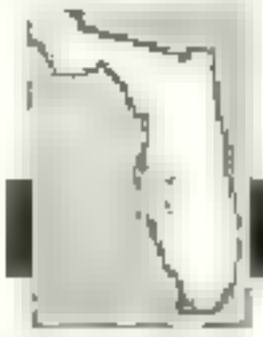
Better Living

A whole new happier way of life awaits you in this modern city of 18,000 on Florida's beautiful Gulf Coast. Come and see for yourself what "Better Living" really means!

New booklet, illustrated with actual color photographs, brings you this friendly area where every good thing that Florida has to offer exists in abundance.



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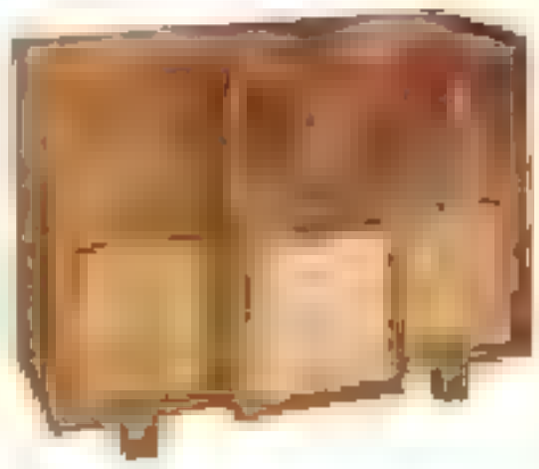
Admiral Triple Thrill

FM-AM RADIO

2-SPEED PHONOGRAPH

MAGIC MIRROR TELEVISION

Complete HOME ENTERTAINMENT ALL IN *One* LUXURIOUS CONSOLE *$549.50*



From Admiral — comes this triple thrill in complete home entertainment. MAGIC MIRROR TELEVISION brings you sharp, clear pictures on the 161 square inch viewing screen — the largest picture tube of any super-powered [illegible] receiver to assure dependable performance even in receiving areas [illegible] channel coverage. Hear [illegible] a powerful FM-AM RADIO [illegible] be. Hear [illegible] free FM as [illegible] Admiral. New 2-SPEED AUTOMATIC PHONOGRAPH plays standard as well as the sensational new LP (long play) microgroove records. Imagine! 45 minutes of music — equivalent to a standard 6 record album — all from a single 12" record. Truly a [illegible] all [illegible] in a beautiful [illegible] cabinet [illegible] as [illegible] as wire. See it! Hear it! Today!

Admiral 2-Step Network Television!
NBC Network, Sundays 7:00 p.m. EST

AMERICA'S SMART SET *Admiral*

PLAY AS YOU GO

You get more fun out of the pleasures today's travel affords when your train is powered by a General Motors Diesel locomotive.

For then you travel with a new comfortableness — and a new speed, too. Often on the straightaways, your train will top 100 miles an hour.

General Motors locomotives have also brought a new cleanliness to travel — no smoke and cinders to mar your appearance; no clouds of steam to mar your view.

[illegible] years General Motors locomotives have held the records for on-time arrivals.

[illegible] to see why 197 of America's [illegible] name trains are headed by General Motors power.

Easy to understand why better trains follow General Motors locomotives.

ELECTRO-MOTIVE DIVISION

GENERAL MOTORS • LA GRANGE, ILL.

Home of the [illegible]

Christmas Gego

2. He'll be home for Christmas! [illegible]

3. They'll be home for Christmas! [illegible] the greatest gift to that proud [illegible] and Grandmother will be the [illegible] first grandchild.

4. She'll be home for Christmas! "[illegible] Mother and Dad," she wrote. "I [illegible] Christmas with a straight 'A' for [illegible] [illegible] you think that deserves [illegible] [illegible] Mother and Father [illegible] [illegible] way to be home [illegible]

To be sure you'll be home for Christmas

Go Pullman

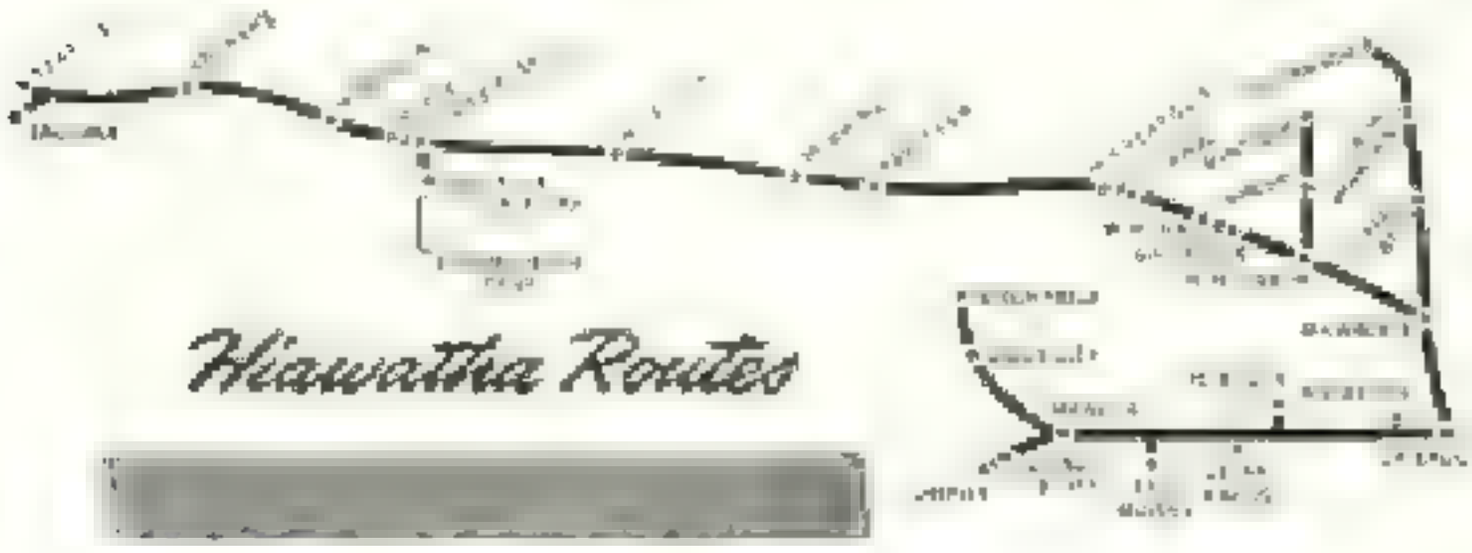
THE SAFEST, MOST COMFORTABLE WAY TO GET THERE

New Hiawathas are rollin'!

Sixteen Milwaukee Road Hiawathas are now rolling up nine thousand miles a day of superb service in ten mass-teen and northwestern states. Velvety smooth and silent, these orange-and-maroon-and-silver flyers are as delightful to look at as they are to ride in—close to perfection for day or night rail travel.

With a huge fleet of new cars, the great majority of them built in its own shops, The Milwaukee Road has put more Hiawathas on the road—re-equipped existing Hiawathas—improved many other through trains.

Hiawatha-land is shown on the map below. Anywhere you go in this broad area, you can treat yourself to a restful, restful ride on a Milwaukee Road Speedliner. H. Sengstacken, Passenger Traffic Manager, 708 Union Station, Chicago 6, Illinois.



THE
Milwaukee
ROAD

Speedway of the Speedliners


BRINGS OUT THE
THRILL
IN YOUR FILMS!
Natco
WORLD'S FINEST
SOUND-PROJECTOR
$298.50
CHOSEN BY GOVERNMENT
... PRICED FOR HOME USE
You'll thrill to Natco's amazingly true-to-life image and tone. Light, rugged construction ... Great power (largest speaker-amplifier of price) ... World's simplest projector to operate. Speaker in detachable cover. These features make Natco a government favorite. Important, also, to industry, church, school, home. See dealer or write for literature today.
NATCO, 565 N. Sacramento Blvd., Chicago 12, Illinois


the magnificent
Magnavox
Radiophonographs $179.50 to $895.
Television Receivers $299.50 to $750.
(may be added at any time)
The Magnavox Company, Ft. Wayne 4, Ind.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will help you complete
your plans to come to
ALBUQUERQUE
In the Heart of the Health Country
ALBUQUERQUE CIVIC COUNCIL
DEPT. C6 ALBUQUERQUE NEW MEXICO
★ FOR THOSE WHO CANNOT
OR SHOULD NOT CLIMB STAIRS
Sedgwick

HUNDREDS OF RUBBER CLEATS TO GRIP IN SNOW, SLUSH, MUD!

THE GENERAL *Winter-Cleat*

SLUSHY, ICY GUTTERS—With Winter-Cleats you pull away easily from ice-rutted curbs.

UNPLOWED SIDE STREETS—No more stalled mornings before snowplow gets to your street.

INCLINED DRIVEWAYS—No slip, no spin. No need for unsightly cables or corrosive salt.

UNIMPROVED ROADS—Winter-Cleats are double thick and cleated to GRIP in mud and mire.

How to Save Over $100

Yet Own as Fine a Hearing Aid as Money Can Buy! See Coupon Below

HEAR BETTER OR PAY NOTHING! Wear the New Zenith "75" at home, at work, anywhere. If it isn't better than you ever dreamed AND hearing aid could be, return it within 10 days of receipt and Zenith will refund your money in full.*

[illegible]

Instantly Adjustable—by You [illegible]

Lowest Operating Cost, Too! [illegible]

NEW **ZENITH** RADIONIC HEARING AID

BY THE MAKERS OF ZENITH RADIOS

[illegible]

ORDER NOW. MAIL THIS COUPON

[illegible]

AMERICAN

MODEL 22 TANDEM

MODEL 22 TANDEM

NEW CREST MODEL

[illegible]

AMERICAN COACH CO
Consumer [illegible]

See AMERICAN FIRST

TO HAWAII only $270 ROUND TRIP

from San Francisco or Los Angeles

(plus 10% Federal Tax)

Charter Flights to the Islands

ONLY 9½ HOURS TO HAWAII FROM CALIFORNIA

UNITED AIR LINES

FOR RESERVATIONS CALL UNITED OR AN AUTHORIZED TRAVEL AGENT

A gift in a million...for a wife in a million!

[illegible] model (NFS), illustrated. [illegible] shelves . . . two deep fruit and vegetable drawers. Freezer compartment [illegible]

General Electric 1949 Two-door Refrigerator-Home Freezer Combination

This year—if you want to make your wife the happy woman in the world—let your mind go [illegible] for a new G-E [illegible]

For [illegible] all that it means to have the most advanced refrigerator.

But [illegible] your wife will! She'll fall in love with the [illegible] temperature [illegible] temperature [illegible] up to 32 degrees below [illegible]

[illegible] moisture-control [illegible]

[illegible] storage [illegible]

And she'll know, of course, that the General Electric trademark means the most dependable [illegible] backed by an unrivalled record for performance.

[illegible] your wife to the nearest General Electric [illegible]

[illegible]

More than 1,700,000 General Electric Refrigerators in service ten years or longer.

GENERAL ELECTRIC

"Indigestion"

often is only a minor discomfort due to improper habits of eating and drinking, nervousness, fatigue, and emotional strain.

Sometimes, however, "indigestion" may be a warning sign of certain diseases.

So, if you have "indigestion" frequently, you should see your doctor. Remember

...better digestion is a step toward better health!

Good living habits can be an aid to good digestion

When the digestive system fails to function properly, "indigestion" usually results. Fortunately, minor ailments often can be corrected by following a few common sense rules, under the guidance of your physician. He may [illegible] meal [illegible] in your diet, eating moderately, keeping in good physical condition, and avoiding mental or emotional [illegible].

[illegible] promise for better control of physical diseases of the digestive system. In certain types of [illegible] are finding psychotherapy increasingly important.

If you have frequent attacks of "indigestion," don't try to be your own doctor. Self-[illegible] use of home remedies may do more harm than good, and may delay the start of proper medical care.

Metropolitan Life Insurance Company

TO VETERANS—IF YOU HAVE NATIONAL SERVICE LIFE INSURANCE—KEEP IT!

"Ah, tell your little story to every Santa Claus!"

said **MRS. LAWRENCE TIBBETT**

when she saw the beautiful

new **ELGINS** . . . *and learned of*

their DuraPower Mainspring

ELGIN WATCHES

TIMED TO THE STARS!

The genius of America ★ ★ to wear on your wrist


Coca-Cola
Where there's Coca-Cola there's Hospitality

Give something "alive"

Kodak

On the movie screen at home, *all the* [illegible] *and life of* [illegible] 'Isn't [illegible] with a Cine-Kodak [illegible] or Kodascope projector! [illegible]

Give Movies—The Cine-Kodak Way

Cine-Kodak Eight-25 Camera [illegible] it makes marvelous [illegible] from the [illegible]

Cine-Kodak Magazine 8 Camera [illegible] just slip [illegible]

Kodascope Eight-90A Projector – [illegible]

Kodascope Eight-33 Projector—A fine [illegible]

Cine-Kodak Magazine 16 Camera – All the [illegible]

Kodascope Sixteen-10 Projector—A wide [illegible]

Kodascope Sixteen-20 Projector – [illegible] Sixteen-10 [illegible]

*Prices on this page are subject to change without notice.

[illegible]

EASTMAN KODAK COMPANY, Rochester 4, N. Y.

UNION PACIFIC

"Smooth as Silk"

[illegible] after a [illegible] Union Pacific [illegible] bed. Glid[illegible] perfect [illegible]

Streamliner

"CITY OF LOS ANGELES"

[illegible]

"CITY OF SAN FRANCISCO"

[illegible]—San Francisco

"CITY OF PORTLAND"

[illegible]

"CITY OF DENVER"

[illegible]—Denver

"CITY OF ST. LOUIS"

[illegible] Denver [illegible]

UNION PACIFIC RAILROAD

Road of the Daily Streamliner

Enjoy SAN DIEGO

with Old Mexico added for extra fun!

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"Stop Climbing Stairs"

THE SHEPARD ELEVATOR CO.

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Judd & Detweiler, Inc.

Printers

The wonderful gift of Time

[illegible] — [illegible] To give [illegible] gift like the gift of [illegible] [illegible] time's to come, echoing "Merry Christmas" all the way.

For a gift to last—none is more perfect than a watch. Your jeweler has a wide choice to show you, achievements of the skill of free craftsmen—of America and Switzerland—oldest democracies on two continents.

WHEN YOU BUY A WATCH, REMEMBER . . .

1. Many new styles now available, including [illegible]

2. All watches should be wound [illegible]

3. No matter what the make of your watch, [illegible]

For the gifts you'll give with pride—let your [illegible] guide

The WATCHMAKERS OF SWITZERLAND


"—In life, as in these, forethought joins" [illegible]

THE NEW 1949

REMINGTON DE LUXE PORTABLE

is the Christmas gift for your [illegible]!

You'll marvel at its new, easy-to-[illegible] touch. It keys [illegible] patterned after the [illegible] Remington Electric DeLuxe keyboard. Smooth, responsive action tops many other features including Remington's famed sturdy construction . . . perfected through 75 years of typewriter craftsmanship.

Here's why the New 1949 Remington DeLuxe makes a [illegible] for its lucky owner.

Eminent educators and psychologists proved through [illegible] tests that students who use a [illegible] more subjects. Which means — since homework gets done faster and better — [illegible] time to take part in their favorite extra-curricular activities.

P.S. to the Family Santa — See your dealer now to be sure there's a New 1949 Remington DeLuxe under your Christmas tree! Compare it against nine new typewriter buys with your finest [illegible] how it pays to get [illegible] a desk to [illegible] for easier typing.

Remington Rand

75

THE NATIONAL GEOGRAPHIC SOCIETY'S

LARGE TEN-COLOR WALL MAPS

Make Timely Christmas Gifts for Friends of All Ages

You and your friends will find these accurate, [illegible] maps a most useful [illegible] following [illegible] world drive up[illegible] National Geographic Society's [illegible] business associations, place [illegible] the news [illegible] found on these legible [illegible] Masterpieces of cartography, [illegible] asked for with mounting [illegible] Christmas gifts for [illegible] of life.

Map Indexes: Available for maps marked with an asterisk (*) in the adjoining order blank; make easy the location of names on corresponding maps and describe the areas covered.

Map Case: The [illegible] each file [illegible] blue a leaf [illegible] maps or [illegible] it use. [illegible] pockets can hold 20 [illegible] paper maps of *standard* sizes or 10 *folded* paper maps with indexes.

Central & Suburban Washington, D.C.: This new, two-sided, pocket map measures 31¾" x [illegible] inches and is the most complete, detailed, [illegible] the Nation's Capital in existence. [illegible] *fold cabinet*, plus indexes on [illegible] every point of interest.

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Bible Lands—64½" x 44½": Bible and [illegible] students and teachers will welcome this [illegible] *enlargement* of the timely map issued with the December, 1948, National Geographic Magazine.

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The World—67" x 43½": Using Van der Grinten's projection, this *enlarged* [illegible] portrays the earth as one unified picture. Insets [illegible] spread of 1st and 2nd World [illegible] main railroads, time zones, 4,871 place names, elevations and depths, international boundaries as of Sept. 1, 1950.

No. & So. Hemispheres—67" x 35½": [illegible] short cuts by air across polar regions. [illegible] great-circle routes. Insets show [illegible] climate, forests, arctic lands, [illegible] place names. A useful, *full-color enlargement.*

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National Geographic Society,
Dept. E-D, Washington 6, D. C. 1949

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China*			
Continent Landed Matter*			
Central and Western Hemisphere*			
[illegible]			
Europe & Mediterranean*			
Europe and Near East*			
[illegible] & Mediterranean*			
Germany & Approaches*			
India & Burma*			
Indian Ocean*			
Japan & Adjacent Regions of Asia & Pacific Ocean*			
Japan & Korea in detail*			
North America*			
No. & So. Hemispheres*			
Pacific & Sea of Japan*			
Pacific Ocean*			
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Philippines*			
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The World*			
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FOR THE YEAR 1949 IN THE

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Occupation _____
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Address _____

_____ *for membership in The Society.*

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Address _____

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